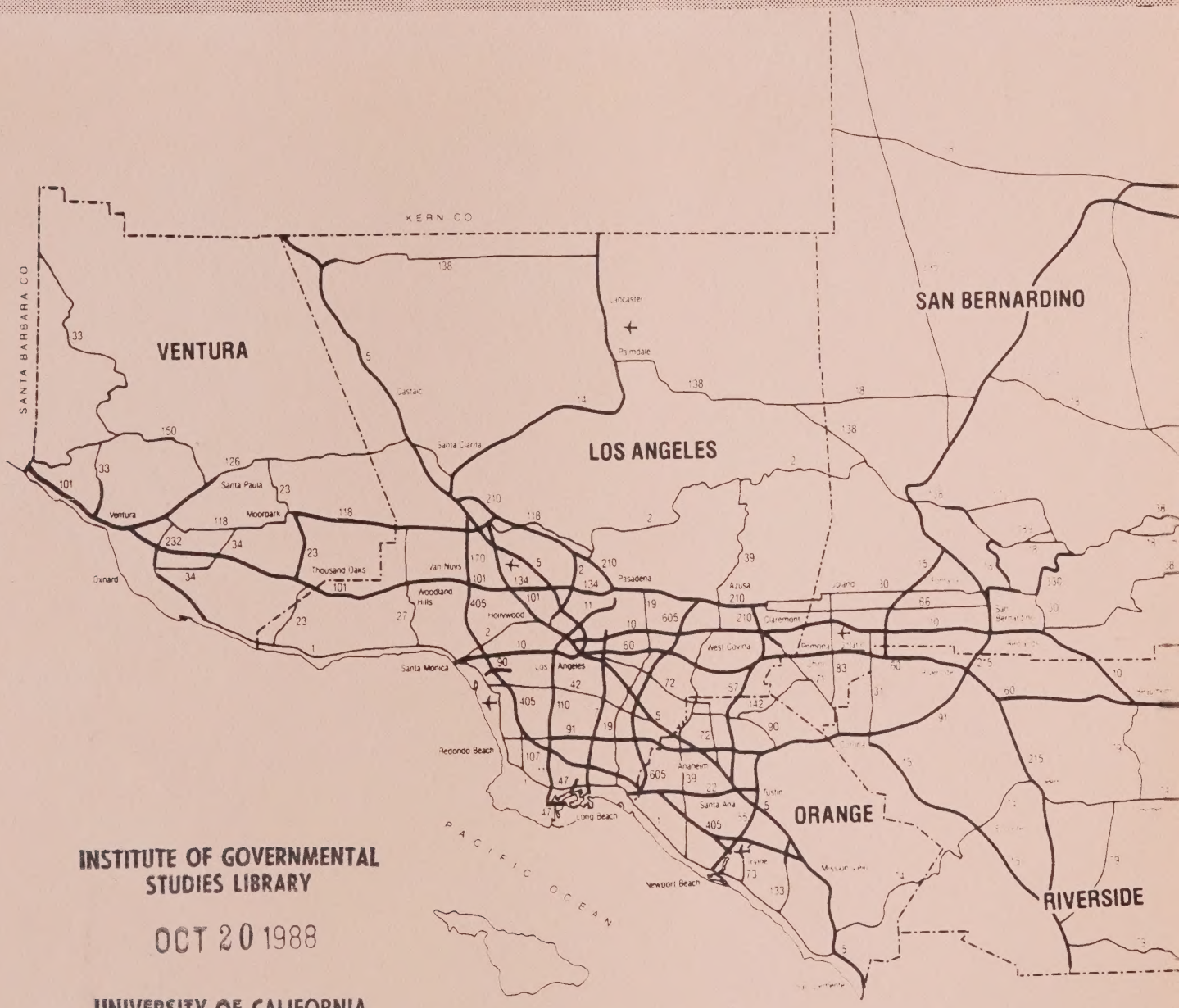
DRAFT

REGIONAL *MOBILITY* PLAN

OCTOBER 1988
DRAFT ENVIRONMENTAL IMPACT REPORT



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENT

DRAFT ENVIRONMENTAL IMPACT REPORT

REGARDING THE

1988 SCAG REGIONAL MOBILITY PLAN

Prepared for

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
600 South Commonwealth Avenue, Suite 1000
Los Angeles, California 90005
(213) 385-1000
Contact: Paul H. Hatanaka, Principal - Environmental Planning

Prepared by

PLANNING CONSULTANTS RESEARCH
1251 Santa Monica Mall, Suite One
Santa Monica, California 90401
(213) 451-4488 / FAX 451-5279
Contact: Jay Kaplan-Wildmann, Project Manager

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State Clearinghouse 87-121613

October 1988

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1. Introduction

1. INTRODUCTION

The subject of this Environmental Impact Report (EIR) is the proposed 1988 Regional Mobility Plan (RMP) of the Southern California Association of Governments (SCAG). SCAG originated the proposed program and acts as lead agency.[1] As the RMP consists of a group of discretionary actions on the part of SCAG, the project is subject to the California Environmental Quality Act of 1970 (CEQA) and the State CEQA Guidelines.[2,3]

Pursuant to CEQA guidelines, SCAG circulated a Notice of Preparation (NOP) for the proposed plan in December 1987; the NOP was routed through the State Clearinghouse (SCH 87-121613), to notify environmental review agencies that the EIR was under preparation. A copy of the NOP and a list of parties responding to the notice is included as Section 7 of this EIR.

The Regional Mobility Plan for the SCAG region sets policy on transportation improvements and programs; identifies implementation actions and agencies to carry out the actions; and defines a financial program to raise needed revenues through the year 2010 for the six counties of the SCAG region. Elements of the RMP address the following issues: growth management to promote job/housing balance; transportation demand management; transportation system management; construction of facilities for high-occupancy vehicles, mixed-flow and transit; and financing. The primary goal of the RMP is to attain and maintain mobility in an environment of continuing population and economic growth.

The purpose of this EIR is to provide objective and authoritative planning materials in an informational format to assist the Southern California Association of Governments elected officials, staff and the public at large in their consideration of the environmental context of the proposed program. The EIR is intended to provide a mechanism for disclosing potential environmental impacts of the Draft RMP relative to existing conditions; to increase citizens' awareness of and foster participation in the Draft RMP planning process; and to alert the SCAG Executive Committee to the effects of the plan and suggest measures to be taken to mitigate significant impacts.

Based on the NOP and responses from interested parties, the scope of this EIR was set to include the following twelve (12) environmental subject areas: mobility and access, air quality, energy conservation, geology and

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[1] Authority for Regional Transportation Plan preparation is found in: State of California. Government Code. Section 65080(b).

[2] State of California. Public Resources Code. Sections 21000 et seq. Adopted 1970.

[3] State of California. California Administrative Code. Title 14, Sections 15000 et seq.

seismicity, biological resources, water resources, noise, cultural resources, social, urban form and growth, and regional economy.

This document is organized to provide various levels of information regarding the program's potential impacts. Section 2 - Executive Summary, provides an overview of the RMP's effects. Section 3 - describes the proposed project. Section 4, the most detailed level of analysis presented, characterizes the project's regional setting, evaluates potential project impacts, and recommends mitigation measures where appropriate. Section 5 summarizes the findings of the environmental analysis in terms of significant adverse impacts and growth inducing effects. Section 6 compares the proposed project to a range of EIR alternatives. Sections 7 and 8 present the EIR's Notices of Preparation and Completion, respectively. Section 9 appendicizes relevant data tables, and Section 10 lists contributing organizations and individuals.

The Draft EIR assesses the potential individual and cumulative effects that the Draft RMP may have on the environment, lists ways to minimize significant impacts, and evaluates alternatives to the Draft RMP. The State CEQA Guidelines require that EIR impact analyses correspond to the degree of specificity involved in the underlying activity being analyzed. Due to the programmatic nature and regional scale of the RMP, impacts associated with the Draft RMP are primarily assessed at a regional level. Some impacts are also evaluated at the county or subregional level. Local and project-specific impacts are more appropriately addressed at the time that specific projects and programs undergo environmental review by implementing transportation agencies, authorities and local governments; such impacts can be predicted with greater accuracy at the local plan and project level.

Comments on this Draft Environmental Impact Report will be replied to in the Final EIR, and should be directed to the following address:

Mr. Paul H. Hatanaka, Principal
SCAG - Environmental Planning
600 South Commonwealth Avenue, Suite 1000
Los Angeles, CA 90005
(213) 385-1000

2. Summary

2. SUMMARY

PROPOSED PROJECT

The Regional Mobility Plan (RMP) for the SCAG region sets policy on transportation improvements and programs; identifies implementation actions and agencies to carry out the actions; and defines a financial program to raise needed revenues through the year 2010 for the six counties of the SCAG region (Figure 1). Elements of the RMP address the following issues: growth management to promote job/housing balance; transportation demand management; transportation system management; construction of facilities for high-occupancy vehicles, mixed-flow and transit; and financing. The primary goal of the RMP is to attain and maintain mobility in an environment of continuing population and economic growth.

PROJECT IMPACTS

The anticipated environmental effects of the proposed program are summarized in Table 1. The table is organized to briefly characterize the RMP's potential beneficial and adverse consequences, to identify recommended mitigation measures, if any, and to present conclusions regarding the resulting net effect. As shown in Table 1, the RMP has a broad profile of effects, with potential for both adverse and beneficial effects. In summary, potential significant beneficial effects would result from the RMP with regard to mobility and access, air quality, energy and urban form and growth; potentially significant adverse impacts would result for physical subject areas (geology and seismicity, biological resources, water resources and cultural resources); combinations of positive and negative effects would occur in the areas of visual resources, noise, social effects and regional economy.

ALTERNATIVES

The Draft EIR considers five full alternatives to the proposed RMP, as detailed in Table 2. The No Project Alternative results in severe traffic congestion, and operational environmental impacts, including excessive air emissions and fuel consumption. The two Facilities-Intensive Alternatives (Strategies 1 and 2, responding to trend projections of growth and job/housing balance, respectively) result in excessive construction impacts, high costs and do not achieve RMP mobility goals. The two Demand Management Alternatives (Strategies 3 and 4, responding to growth trends and job/housing balance, respectively) improve mobility and result in impacts and benefits similar to those of the proposed RMP, though the RMP achieves these results under a more realistic growth forecast. The EIR alternatives did not reveal a substitute program for the proposed RMP which would meet the program's goals while resulting in clearly superior environmental expectations.

TABLE 1

SUMMARY OF PROJECT EFFECTS

Environmental Issue	Significant Effect (Beneficial/Adverse)	Mitigation	Conclusion
Mobility and Access	Beneficial. Attains and maintains mobility in an environment of continuing population and economic growth.	--	Significant Beneficial.
Air Quality	Beneficial. Applies TDM, TSM, growth management and AQMP TCMs to reduce air impacts of growth and travel.	--	Significant Beneficial.
Energy	Adverse. Increases energy consumption, due to growth and increased travel. RMP gasoline consumption in the year 2010 would exceed 1984 levels.	AQMP alternative fuels programs: - methanol vehicles - electric vehicles - rail electrification.	Significant Beneficial After Mitigation.
Geology and Seismicity	Adverse. Presents significant risk due to construction of structures in areas of geologic hazards, including fault zones, liquefaction, landslide and subsidence areas.	Proper facility alignment and design: - avoidance of hazard areas - drainage and landscaping - accounting for compression of fill soil - design incorporating seismic safety.	Non-Significant Adverse After Mitigation.

(continued)

TABLE 1 (continued)

SUMMARY OF PROJECT EFFECTS

Environmental Issue	Significant Effect (Beneficial/Adverse)	Mitigation	Conclusion
Biological Resources	Adverse. Several new highways and corridors traverse sensitive areas and will cause loss of habitat or risk to rare or endangered species.	Habitat protection and/or replacement where appropriate: - alignments which minimize disturbance - compliance with wetlands and coastal zone requirements - design to minimize barrier effects.	**Significant Adverse After Mitigation.**
Water Resources	Adverse. Several projects may change flow patterns, increase runoff, and reduce runoff water quality.	Proper facility alignment and design: - alignments which avoid flood hazards and minimize severe cuts and steep banks - Best Management Practices for erosion and sediment control - Maintenance of natural conditions, reducing stream crossings and retaining permeable surfaces.	**Non-Significant Adverse After Mitigation.**
Visual Resources	Beneficial. Proper design of new facilities can open access to scenic resources. Adverse. Construction of new freeways and transit guideways, especially aerial alignments can disrupt or block views.	Designation of new scenic routes where appropriate.	**Significant Adverse After Mitigation.**

(continued)

TABLE 1 (continued)

SUMMARY OF PROJECT EFFECTS

Environmental Issue	Significant Effect (Beneficial/Adverse)	Mitigation	Conclusion
Noise	Beneficial. Lower congestion may reduce trip diversion and neighborhood traffic intrusion. Adverse. New roadway and transit facilities will add to existing noise sources. Aerial alignments will expand noise contours. Alternative work schedules may create more traffic noise during sensitive times of day.	Construction of soundwalls and noise barriers as appropriate.	Significant Adverse After Mitigation.
Cultural Resources	Adverse. Construction of new facilities without proper safeguards may result in destruction of cultural or scientific resources.	Proper techniques for testing and salvage of sites: - alignments which avoid known sites - relocation of sites - preservation of historic structures.	Non-Significant Adverse After Mitigation.
Social	Beneficial. The plan will improve access to and ties between communities of the region. Transit measures will improve access to transportation facilities for the growing transit dependent population. Adverse. Some new facilities will result in displacement of houses and businesses. Construction and operation of facilities may disrupt communities.	Proper design, construction, phasing, and relocation programs where appropriate.	Significant Adverse After Mitigation.

(continued)

TABLE 1 (continued)

SUMMARY OF PROJECT EFFECTS

Environmental Issue	Significant Effect (Beneficial/Adverse)	Mitigation	Conclusion
Social	Beneficial. The plan will improve access to and ties between communities of the region. Transit measures will improve access to transportation facilities for the growing transit dependent population. Adverse. Some new facilities will result in displacement of houses and businesses. Construction and operation of facilities may disrupt communities.	Proper design, construction, phasing, and relocation programs where appropriate.	Significant Adverse After Mitigation.
Urban Form and Growth	Beneficial. Overall, the RMP accommodates planned growth and incorporates measures to improve job/housing balance.	--	Significant Beneficial.
Regional Economy	Beneficial. The RMP will provide access to employment centers, facilitate goods movement and stimulate local economies. Adverse. Some aspects of TDM measures are perceived as detrimental to business.	Assisting employers in making adaptations to TDM.	Significant Beneficial After Mitigation.

Table 2:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
MOBILITY			
Vehicle Miles Traveled (Thousands)	221,292	284,382	376,187
Vehicle Hours Traveled (Thousands)	6,343	7,850	19,575
Hours of Delay (Thousands)	629	899	10,132
Percent Delay	10% (6 minutes/hour)	11% (7 minutes/hour)	52% (32 minutes/hour)
Speed (mph):			
All Facilities	35	36	19
Freeways	47	45	24
Miles of Congestion:			
AM Peak	452	280	2,564
PM Peak	856	612	4,567
Transit Mode Split			
Home-to-Work	6.58%	19.3%	5.10%
Average Auto Occupancy			
Home-to-Work	1.129	1.186	1.150
AIR QUALITY			
On-Road Mobile Source Emissions (tons/day)			
ROG	698	231	345
NOx	899	281	618
SOx	34	36	54
PM-10	41	44	62
CO	5,417	2,259	4,066
ENERGY			
Fuel Consumption (million gal/day)			
Gasoline	13.8	13.5	22.7
Diesel	2.0	1.7	2.9
GEOLOGY/SEISMICITY			
Added Highway Lanes Intersecting Faults	N/A	160	8
New Rail Corridors Intersecting Faults	N/A	23	2
NATURAL RESOURCES			
Expanded Highway Facilities in Urbanizing Areas	N/A	1,490	176

ALTERNATIVES EVALUATION MATRIX

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
339,481	325,173	281,226	304,594
9,172	8,578	7,779	8,556
1,153	849	895	1,300
13% (8 minutes/hour)	10% (6 minutes/hour)	11% (7 minutes/hour)	15% (9 minutes/hour)
37 48	38 50	36 45	36 42
676 1,063	403 752	220 611	525 1,042
7.64%	7.42%	19.40%	19.45%
1.202	1.201	1.187	1.187
244 523 38 53 3,013	238 508 37 51 2,958	218 440 32 44 2,732	226 465 34 47 2,800
16.0 2.1	15.3 2.0	13.4 1.7	14.4 1.9
330	260	96	144
17	12	14	14
1,771	1,567	895	900

Table 2:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
VISUAL RESOURCES/ AESTHETICS			
Miles of Elevated Highways	N/A	20	0
Parks and Designated Natural Areas Subject to Intrusion by Added Highway Facilities	N/A	57	0
NOISE			
Lane Miles of Added Highway Facilities:			
-in Urban Areas	N/A	2,500	330
-in Non-urban Areas	N/A	133	80
REGIONAL ECONOMY			
Annual Cost of Congestion ($1987, billions)	$1.8	$2.6	$26.3
Annual Personal Vehicle Costs ($1987, billions)	$15.7	$19.9	$26.6
Commuter Flow Efficiencies:			
Average Home-to-Work Trip Length (miles)	10.7	11.1	12.4
Average Home-Work Trip Time (minutes)	19	19	40
Average Home-Work Trip Speed (mph)	34	36	19
SOCIAL IMPACTS			
Potential Displacements Associated With At-Grade Expansion of Existing Highways			
Acres (12'/lane)	N/A	3,670	N/A
Dwelling Units (6/acre)	N/A	22,170	N/A
Persons (2.5/unit)	N/A	55,670	N/A
Acres Subject to Construction Impacts (within 100 feet of new highway construction)	N/A	21,340	N/A
Transit Availability:			
Miles of Rail -- Heavy and Light Rail	N/A	360	42

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
460	400	12	25
55	57	34	41
6,800	5,700	1,500	2,300
340	140	80	90
$9.3	$6.7	$2.6	$3.7
$24.0	$23.0	$19.9	$21.6
12.3	11.1	11.1	12.3
21	18	19	21
36	37	36	35
6,000	5,400	2,200	3,400
35,700	32,100	13,300	20,400
89,200	80,360	33,400	50,900
22,700	22,300	12,800	14,400
367	294	397	497

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
SOCIAL IMPACTS -- REGIONAL LEVEL			
Changes in Real and Perceived Attractiveness of the Region	Increasing congestion during peak hours	Job Housing Balance: Could promote development of additional commercial centers Demand Management: TDM (parking costs, tolls, etc.) could deter businesses and workforce from remaining in or relocating to the region	Unrelieved congestion could deter business and experienced workforce from relocating to or remaining in the region
SOCIAL IMPACTS -- COMMUNITY LEVEL			
Use of Local Streets (Non-Arterial) During Peak Commute Periods	Increasing use of local streets during commute period	Job/Housing Balance: Would promote dispersion of commercial and social facilities closer to residential areas Demand Management: Additional reduction in commuter use of local streets (reduced trips)	Unrelieved congestion could result in heavy use of local streets and neighborhood disruption
Changes in Use of Community and Local Facilities	N/A	Demand Management: Could promote demand for service-oriented facilities closer to residential areas for homeworkers and/or extended hours of service for flextime/staggered schedules Higher parking costs in CBD or other central areas, could affect retail activities Job/Housing Balance: Same as Strategy 2	Arterial congestion could adversely affect local commercial areas
SOCIAL IMPACTS -- EMPLOYMENT LEVEL			
Changes in Workplace	Increasing congestion creates problems for business transactions	Demand Management: Modified Work Week encourages: o transit use/car pools o job sharing o written communication o increased productivity May create problems for: o business administration (e.g. employee benefits) o communication between workers/other businesses Job/Housing Balance: Similar to Strategy 2	Unrelieved congestion could increase worker tardiness, increase delivery costs, reduce customer/client interaction

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
Availability of transit & increased mobility could enhance the image of the region	Facility Construction: Additional facilities could enhance image of region as in Strategy 1 Job Housing Balance: Could promote development of additional commercial centers within the region	Job/Housing Balance: Same as Strategy 2 Demand Management: Mobility restrictions (e.g. parking costs, tolls, etc.) could deter businesses and experienced workforce from remaining in or relocating to the region	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Local street use reduced significantly - less neighborhood disruption	Facility Construction: Same as Strategy 1 Job/Housing Balance: potential for increased commercial traffic on arterials in predominately residential areas	Job/Housing Balance: Same as Strategy 2 Demand Management: Additional reduction in commuter use of local streets (reduced trips)	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Increased access to local and regional facilities	Job/Housing Balance: Would promote dispersion of commercial and social facilities closer to residential areas Facility Construction: Same as Strategy 1	Demand Management: Could promote demand for service-oriented facilities closer to residential areas for homeworkers and/or extended hours of service for flextime/staggered schedules Higher parking costs in CBD or other central areas, could affect retail activities Job/Housing Balance: Same as Strategy 2	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Increased opportunity for smoother business operations and customer/client interaction compared to No Project	Facility Construction: Same as Strategy 1 Job/Housing Balance: Also could isolate businesses from city center Reduces interaction between businesses	Demand Management: Modified Work Week encourages: o transit use/car pools o job sharing o written communication o increased productivity May creates problems for: o business administration (e.g. employee benefits) o communication between workers/other businesses Job/Housing Balance: Similar to Strategy 2	Facility Construction: Similar to Strategy 1 Demand Management: Same as Strategy 3

Table 2:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
SOCIAL IMPACTS -- PERSONAL LEVEL			
Changes in Lifestyle	Increasing congestion reduces personal time	Job/Housing Balance: Shortened commute for some Increases opportunities for business involvement in civic issues and projects Demand Management: Shift in normal work week may: o alter use of commercial and recreational facilities o reduce social contact o reduce stress of commuting o increase parenting opportunities o increase leisure time Demand management financing mechanisms (e.g. parking costs, tolls) could reduce non-work trips	Increased tension due to congestion delays and longer trip times, reduced leisure time

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
Reduced tension due to fewer delays and shorter trip times compared to No Project May encourage longer home-to-work commute patterns	Facility Construction: Tension reduction same as Strategy 1 Job/Housing Balance: Shortened commute for some Increases opportunities for business involvement in civic issues and projects	Job/Housing Balance: Same as Strategy 2 Demand Management: Shift in normal work week may: o alter use of commercial and recreational facilities o reduce social contact o reduce stress of commuting o increase parenting opportunities o increase leisure time Demand management financing mechanisms (e.g. parking costs, tolls) could reduce non-work trips	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3

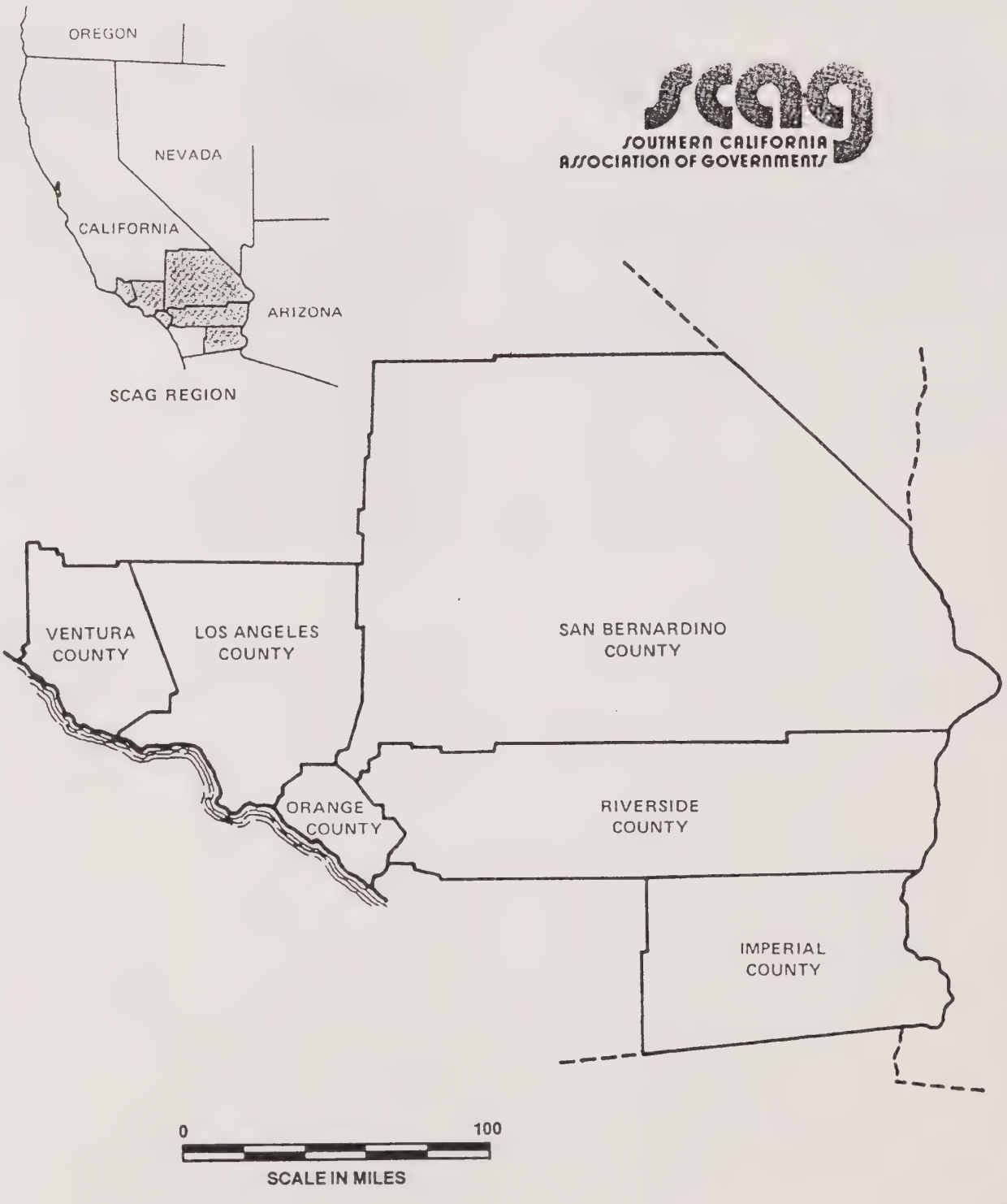

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Figure 1
SCAG RMP PROJECT AREA

3. Project Description

3. PROJECT DESCRIPTION

Background. The SCAG 1988 Draft Regional Mobility Plan (RMP) constitutes both an update of the state and federally mandated Regional Transportation Plan, last amended in 1984, as well as a fresh approach to meeting the mobility and access needs of the southern California region. The RMP serves several roles, including the following:

- As a long-range planning document adopted by representatives of local government, the RMP functions as a policy and program guide for improvements in regional mobility.

- As the state-of-the-art technical forecast of regional transportation demand, needs, capacity, improvement strategies, facilities and financing, which has been carefully examined by implementing and operating agencies, the RMP provides an integrated set of actions to maintain and improve regional mobility.

- As an element of SCAG's Regional Strategic Plan (RSP), the RMP interrelates the other three RSP elements by incorporating assumptions of the Growth Management Plan and the Regional Housing Needs Assessment, by defining transportation control measures used in the AQMP, by providing resultant mobile-source air emissions data for the Air Quality Management Plan, and by recommending feedback policy direction to and from these plans to integrate regional development strategies.

Program Elements. To meet these expectations, the Draft RMP contains elements addressing the following eleven issues salient to regional mobility, detailed below as the technical description of the proposed RMP program:

a. Needs and Deficiencies
b. Policies Element
c. Action Elements:
    i. Growth Management Plan
    ii. Transportation Demand Management (TDM)
    iii. Transportation System Management (TSM)
    iv. Mixed-Flow Facilities
    v. High-Occupancy Vehicle (HOV) Facilities
    vi. Transit and Inter-City Rail Program
    vii. Non-Motorized Transportation
    viii. Financial Strategies
    ix. Aviation
    x. Maritime, Railroads and Goods Movement
    xi. Subregional Area and Corridor Studies

During development of the RMP, SCAG used an approach which integrates land use and air quality considerations into the various action elements which sought to minimize construction of new facilities. An initial year-2010 Baseline Projection provided a technical data base on mobility needs based on

a hypothetical situation of only existing-plus-funded transportation improvements (no new construction after about 1992) and growth levels featuring an imbalanced distribution of jobs and housing (an extrapolation of existing trends). SCAG policy committees then reviewed four alternative strategy mixes of the above elements, examining their broad mobility, environmental and financial implications. SCAG policy committees then directed staff to develop a preferred strategy based on the following criteria:

(1) maintain the same regional growth total as in the Baseline Projection, but identify achievable levels of job-housing balance through sub-regional distributions and mechanisms to realize them;[4]

(2) meet or reduce significant amounts of travel demand through a program to integrate demand management (TDM) and system management (TSM) with commuter (HOV) lanes, transit improvements and ancillary facilities;

(3) identify a set of roadway improvements including widenings, upgrades and new corridors to serve the remaining demand at system capacity or 1984 levels of congestion; and

(4) propose a plan for financing the capital and operating cost shortfalls of these improvements.

Further, in recognition of the important and increasing role of non-state-highways in providing regional mobility, the RMP broadens the definition of the regional highway system to include a large arterial component. This redefinition, by better indicating the full scope of facilities most significantly serving regional mobility, provides a more comprehensive statement of the regional highway planning focus and concern. However, since this plan component is meant only as a preliminary discussion of approaches to meeting growing metropolitan mobility needs after 1992 when the federal Interstate program is scheduled to end, it is not considered a SCAG policy action and will not be a subject of this EIR.

The Port's element of the RMP reflects specific policies adopted subsequent to the 1984 RTP relating to the consolidated rail corridor serving the development of on-dock rail yards at the Ports of Long Beach and Los Angeles. The chapter also incorporates the port access improvements at the Port of Hueneme. Port access improvements for both are included in the mixed flow actions and improvements.

The 1988 Draft RMP leaves intact the currently adopted Aviation element contained in the 1984 RTP. By not revising this element, the RMP continues

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[4] This policy forecast is called Growth Management Alternative-4 Modified Job-Housing Balance (GMA-4MJH). The Baseline Trend Projection is termed GMA-1.

existing programs, including the following principal improvements: expansion of the Ontario and Palmdale Airports to their planned capacities of 12 million annual passengers (MAP) each; requesting the Department of Defense to study consolidating and/or relocating one or more military facilities in the region to allow for civilian aviation uses; further evaluation of airspace management improvements; and development of a general aviation system plan for the region. Actions related to ground access included support for development of remote passenger terminals and increased ground transportation services to airports (as actions analyzed in the EIR on the 1984 RTP, these are therefore not part of the project description for analysis in this EIR).

1988 REGIONAL MOBILITY PLAN ELEMENTS

Plan Goals. The goals of the Regional Mobility Plan include the following:

1. To attain and maintain mobility in an environment of continuing population and economic growth.

2. To provide the capacity necessary to safely and efficiently meet the demand to move people and goods resulting from the overall level and distribution of population, employment, land use and housing growth projected in the adopted growth management forecast (GMA-4MJH).

3. To make the region accessible to everyone including the elderly, the handicapped, and the transit dependent.

4. To adopt to and encourage major changes in travel behavior including both reducing the number of home to work trips and reducing the use of the single occupant vehicle.

5. To achieve an efficient balance among all modes including automobiles, trucks, buses, vans, rail, non-motorized vehicles and new technologies.

6. To maximize the productive use of existing facilities by implementing system and demand management techniques in a cost-effective manner.

7. To be compatible with the environment and to support the air quality management plans of the south coast, southeast desert and south central coast air basins.

8. To support a pattern of development which shortens trip lengths through improved job/housing balance.

Needs and Deficiencies. The Baseline Growth Projection would result in severe congestion in many parts of the region and unacceptable levels-of-service on much of the region's transportation system if no improvements were implemented beyond those currently funded. Hypothetical year-2010 commuters

on the Funded transportation system would experience delayed (stop-and-go) conditions for more than half of the time (32 minutes per hour) of their trips, up from ten percent of the time (6 minutes per hour) in 1984. During the morning peak period (6:30-8:30am) the lane-miles of roadway operating over capacity (in congested conditions) would increase by five times, from 452 in 1984 to 2,564 lane-miles in 2010.[5] Figure 2 illustrates the locations of the most severe congestion under the Baseline Growth Projection on the Funded transportation system - an initial indication of system needs.

Growth Management Plan. The Draft RMP integrates the land use policies, decisions and actions of the Growth Management Plan as the RMP's future year growth assumptions. This is accomplished by using the projections and forecasts of the Growth Management Plan's Preferred Alternative (GMA-4MJH) to reduce and modify the mobility problem. The Growth Management Plan's distribution of population, employment and housing was developed in three steps:

- The existing Baseline Projection (GMA-1) was adapted to serve as a trend projection;
- Subregional housing and employment growth was adjusted to improve the balance of housing and jobs; and
- The population forecast was developed.

This forecast anticipates the addition of 4,527,000 people to the 1988 population of the six-county SCAG region; this 33% increase (47% over 1984) is the equivalent of adding 1.5 cities the size of Los Angeles to the southern California region. The region's forecast for growth in population is accompanied by a 51% increase in employment over 1984 levels.[6,7] Growth in and distribution of population and employment are driving forces which shape future mobility needs. The explicit analysis of the environmental effects of the Growth Management Plan is contained in the GMP Draft EIR and is incorporated here by reference.[8] The RMP EIR additionally evaluates the growth-inducing impacts of the resulting facility development.

In addition to growth, the 1988 RMP must take into account the continuing decline in household size, dispersion of housing growth to outlying

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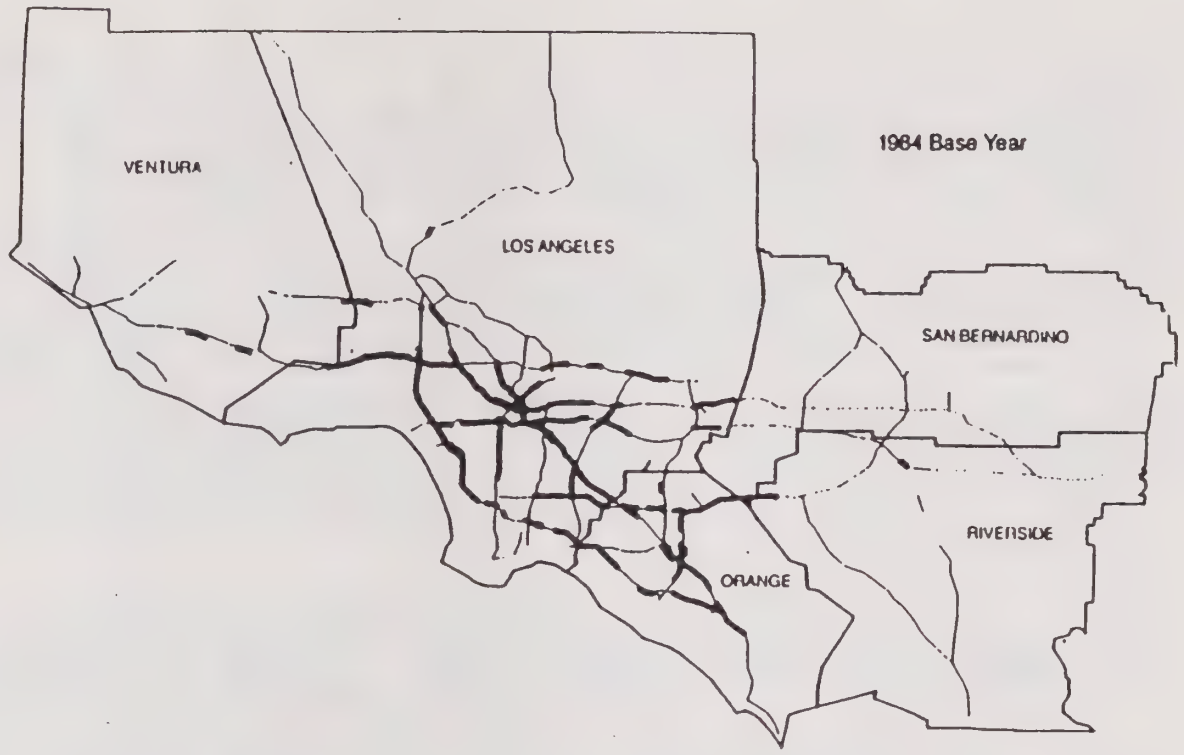
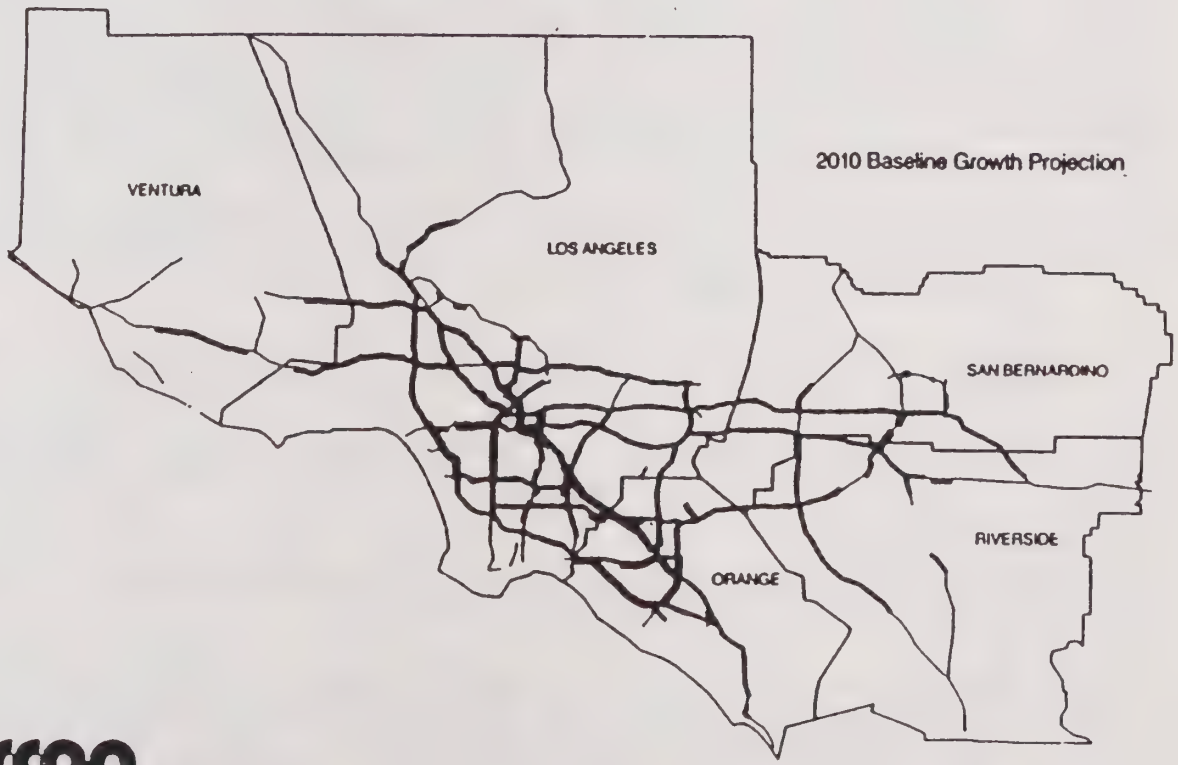
[5] A lane-mile is the equivalent of one mile of one-lane roadway in one direction, or a half mile of two lanes of roadway in one direction, etc.

[6] SCAG. Draft Baseline Projection: Impact Assessment. March 1987.

[7] SCAG. Draft 1988 Growth Management Plan. June 1988.

[8] SCAG. Draft EIR on the SCAG 1988 Growth Management Plan. Prepared by Jones & Stokes Associates, (SCH 88-062924) August 1988.





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LEGEND:

AM-PEAK
VOLUME/CAPACITY > 1.0

Figure 2
CONGESTION:
1984 AND 2010 WITHOUT-PLAN

counties, and a majority ethnic population by the year 2010. During development of strategies for both the RMP and AQMP, policy-makers were compelled by the critical need for a balanced distribution of jobs versus nearby affordable housing, and directed that need back into the Growth Management Plan to be the driving force for the RMP and AQMP.

The Baseline Growth Projection provides a view of the results of continuing the growth trends of the past decade (no change in policies); the Growth Management Plan (GMP) Policy Forecast is the set of assumptions for growth used in the 1988 Draft RMP proposed program. These latter figures would result from jurisdictions across the region adopting the policies and implementing the mechanisms contained in the Growth Management Plan. Although this document will analyze the secondary environmental effects of growth as necessary improvements to the regional transportation system, explicit analysis of the environmental effects of the Growth Management Plan is contained in the Growth Management Plan EIR.

Transportation Demand Management (TDM). The first element of the proposed plan aimed at meeting demand is actually an attempt to reduce demand to manageable levels. Efforts are already underway to reap potential traffic and air quality benefits of Transportation Demand Management (TDM). Cities throughout the southland are adopting ordinances requiring new developments to mitigate their traffic impacts through setting and meeting TDM ridesharing, transit and modified work schedules.[9] The South Coast Air Quality Management District (SCAQMD) adopted Regulation XV in December 1987, requiring employers of 100 employees or more to employ on-site transportation coordinators, to develop TDM site plans designed to meet average vehicle ridership (AVR) goals, and to monitor and report on resulting levels of success.[10] This element includes actions to achieve the following TDM program by the year 2010:

- Implementation of SCAQMD Reg XV, to shift 161,000 Single-Occupant Vehicles (2% of urban area SOVs) to carpools and vanpools - High-Occupancy Vehicles (HOVs).

- Specific ridesharing goals for employment centers to shift an additional 106,400 SOVs (6.4% of centers' SOVs) to carpools and vanpools.

- A transit ridership program to increase commuter transit by 940,000 trips - a shift from about 6% current to 19% commuter transit ridership.

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[9] City of Los Angeles. Coastal Transportation Corridor Specific Plan. (Ordinance 160,394) Adopted September 24, 1985.

[10] SCAQMD Regulation XV requires employer plans to be designed to meet the following AVR goals throughout the South Coast Air Basin: Downtown Los Angeles - 1.75; Urban Basin - 1.50; Outlying Areas - 1.30. AVR is defined as the number of employees arriving to a work site between 6:00-10:00am divided by the number of private vehicles used.

- Alternative work weeks (four-day work weeks every week or every other week - 4/40 and 9/80 schedules) and telecommunications/work-at-home to eliminate 3.1 million person trips or 30% of all work trips - the equivalent of 40% of the region's employment adopting 4/40 work weeks, 20% working under 9/80 schedules, and 20% telecommuting/working-at-home (full-time). An alternative mix would be 40% half-time telecommuting/working-at-home, 40% - 4/40 and 20% - 9/80 work schedules, with no segment of the population maintaining current work schedules.

  The plan also counts on flexible work hours and alternative work schedules to continue the on-going spreading and flattening the AM and PM-peak periods to twice their current length (from 6:30-8:30am and 3:00-6:00pm now, to 6:00-10:00am and 2:30-8:30pm, for example).

Transportation System Management (TSM). Relatively low-cost near-term strategies for better coordinating regional transportation facilities make up the plan's TSM element. Separate components of the TSM element address freeways, surface streets and transit.

Freeways components include ramp metering and bypass lanes, continued study of freeway-to-freeway connector metering, and motorist information systems: message signs, highway advisory radio, and subscription traffic information. The element calls for expanded support for Smart Freeway demonstration project, where motorists are advised to use adjacent surface streets when severe freeway congestion occurs; pilot projects are currently being developed for the Santa Monica (I-10) and Ventura (US-101) Freeways. Other freeway TSM measures include improved incident management and traffic accident response, less-disruptive maintenance practices, implementation of refined law enforcement tactics, improved automobile and truck vehicle safety through stricter enforcement of vehicle code provisions, and truck traffic restrictions including partial bans by time-of-day, location and route, and less disruptive delivery schedules and practices.

Arterial TSM components are based on an emphasis on implementation of currently-available programs, rather than development of new measures. Local jurisdictions would be expected to contribute to arterial TSM through upgrading traffic signals to allow for improved synchronization and coordination, intersection channelization improvements, driveway consolidation, traffic diverters, and restriction of on-street parking. Additionally, the TSM element includes local development of higher-order arterials (high-flow arterials or superstreets) for Beach Boulevard (SR-39) as well as for full implementation along pilot project routes in the Smart Freeway demonstration corridors: I-10 and US-101. A set of high-flow arterials would be required to meet increased demand for intra-subregional travel brought about by improved job-housing balance, to supplement the freeway system, and to provide additional access to regional centers and transportation terminals (including seaports and airports).

Transit TSM measures include bus turn-outs, bus lanes, traffic signal preemption for buses and light-rail transit, and improvements in roadway and pedestrian facilities to better interface with bus and rail systems.

Mixed-Flow Facilities.[11] Due to the very heavy focus of the RMP on strategies for transportation demand management, transit development and growth management, the freeway element presents an improvement program which is quite modest given the levels of needs illustrated in Figure 2. Because of this strategic focus, the freeway element contains few widenings and emphasizes existing freeway gap closures and development of new corridors to serve new growth areas. The plan stresses connectivity and completion over traditional mixed-flow capacity expansion.

The Draft RMP prioritizes facilities improvements into two alternative packages of physical improvements relative to two funding levels: constrained and unconstrained. The following set of figures illustrate mixed-flow, HOV and line-haul transit improvements, showing the higher-priority constrained improvements in red. Both sets of improvements are subject to analysis in this EIR.

The RMP would add 1,846 lane-miles of mixed flow facilities to the regional system. New corridors currently under construction include the Century Freeway (I-105) in Los Angeles County and the Norco Reach (I-15) in Riverside County, as illustrated in Figure 3. New corridors currently in EIR review include Long Beach Freeway (I-710) gap closure in Los Angeles County; the San Joaquin, Foothill and Eastern corridors in Orange County; and SR-30 in San Bernardino County.

Corridors planned for upgrade of existing roadways to controlled-access highways include SR-71 in San Bernardino County, the SR-118 connection to SR-23 in Ventura County, SR-138 in northern Los Angeles and San Bernardino Counties, and SR-86 in Riverside and Imperial Counties.

The plan calls for widening a number of existing freeway routes in each county with the exception of Imperial County, as illustrated in Figure 3. As noted in the relevant environmental sections, many of these routes already contain sufficient right-of-way for the expansion. Some require limited taking of adjacent homes or establishments, but generally impacts are confined to the temporary effects of construction. However, two notable freeway segments with very limited existing right-of-way will require double-decking: the Ventura Freeway (US-101) from Topanga Canyon (SR-27) to the Harbor Freeway (SR-110), and the Santa Ana Freeway (I-5) from I-10 to the Orange County line. This EIR will address construction impacts and aerial expansion of facilities at a programmatic level for these two route segments.

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[11] Mixed-flow facilities are roadways which have not been set aside for any specific mode, and therefore are shared by single-occupant vehicles, high-occupancy vehicles (HOV or ridesharers) and buses.

Figure I-3

DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
HIGH OCCUPANCY VEHICLE IMPROVEMENTS

Constrained Improvements
Unconstrained Improvements
New/Improved Corridor

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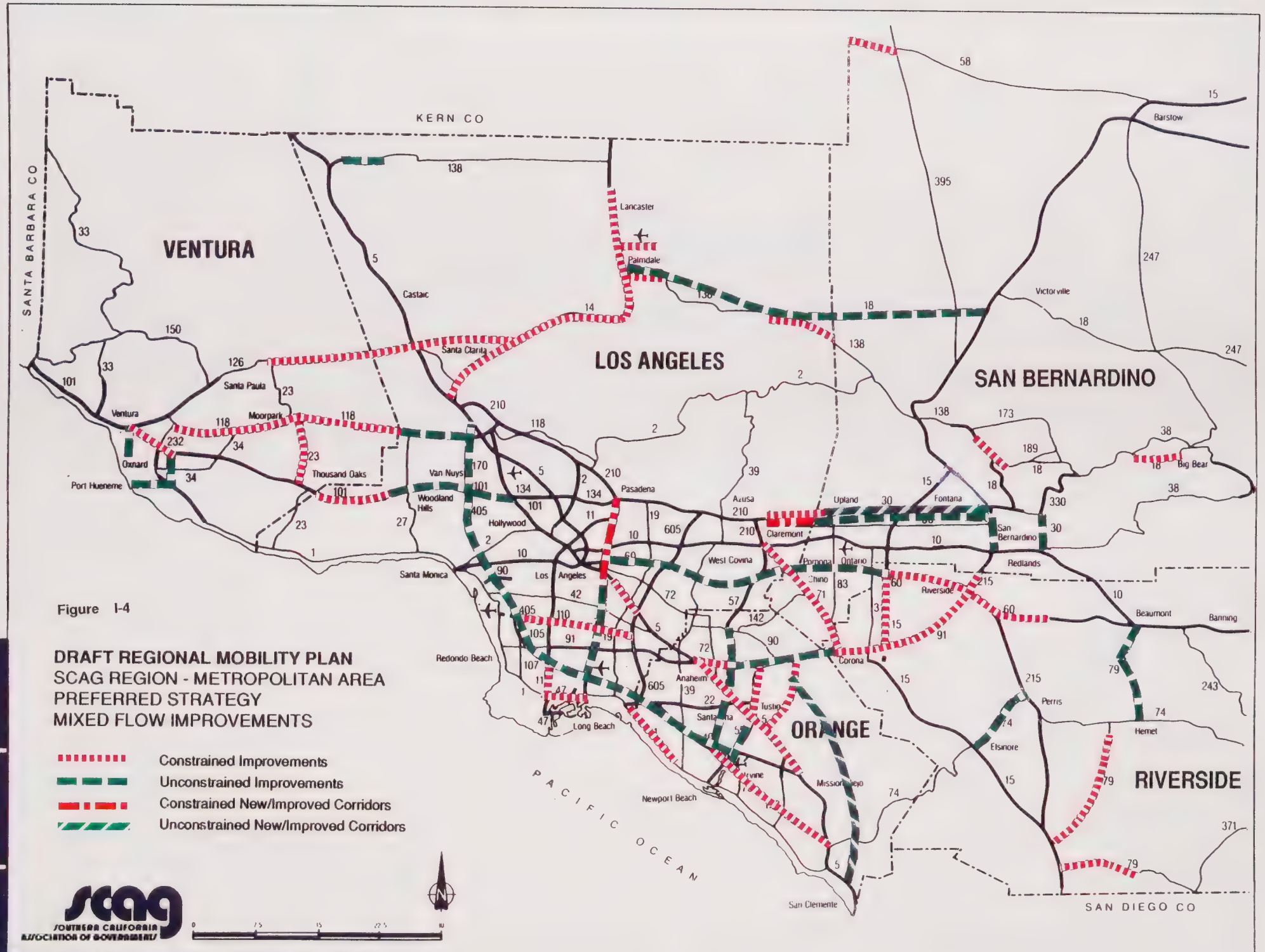

Figure I-4

DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
MIXED FLOW IMPROVEMENTS

Figure I-5

SCAG REGION - EASTERN AREA
PREFERRED STRATEGY
MIXED FLOW IMPROVEMENTS

CONSTRAINED IMPROVEMENTS

CONSTRAINED NEW / IMPROVED CORRIDOR

SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

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Redondo Beach
Long Beach
Anaheim
Santa Ana
Tustin
Irvine
Newport Beach
Mission Viejo
Corona
Riverside
Beaumont
Perris
Hemet
Elsinore
San Clemente
DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
HIGHWAY CONGESTION 2010
VOLUME TO CAPACITY RATIO EXCEEDS 1.00
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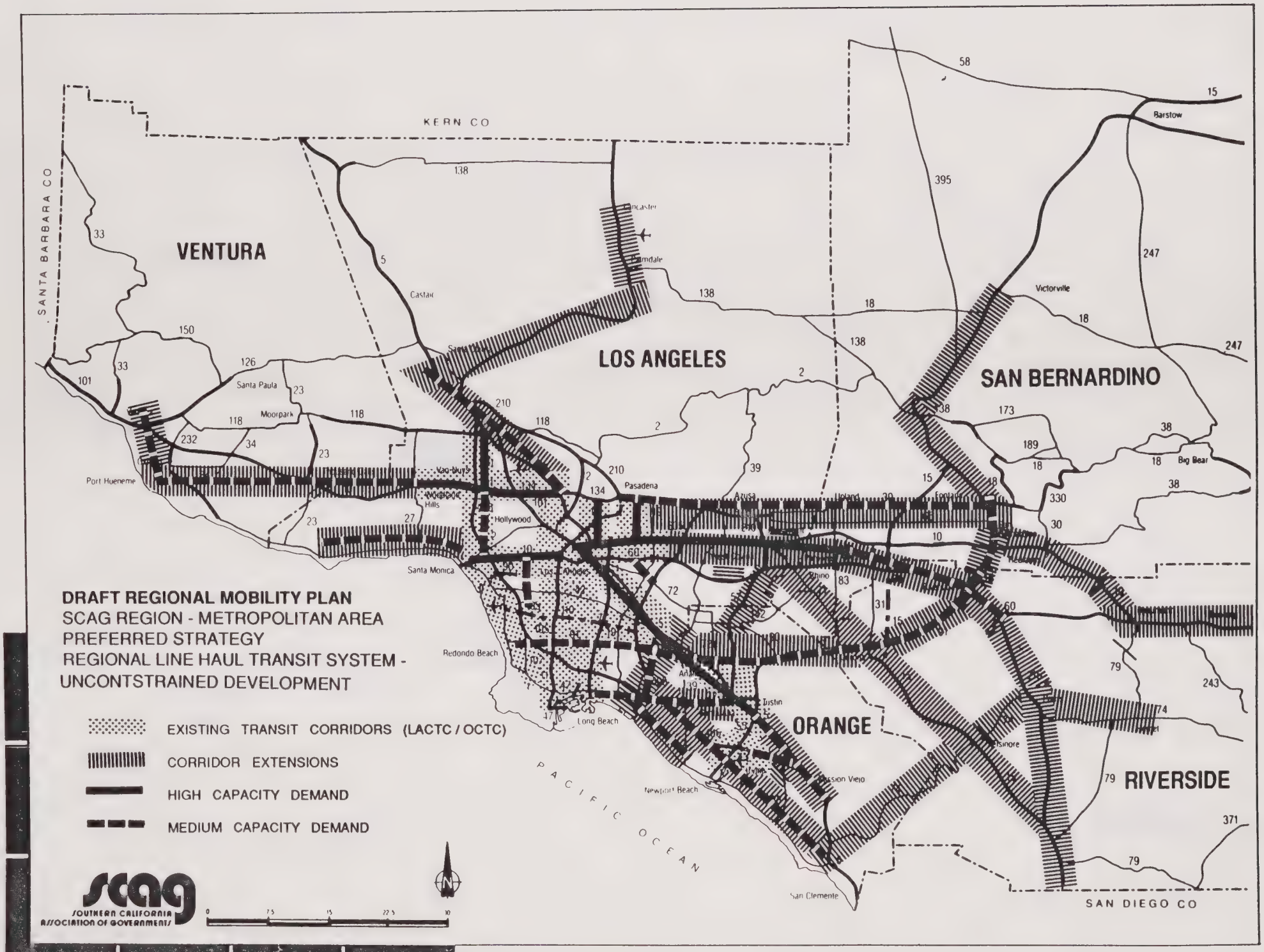
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Long Beach
Irvine
Newport Beach
San Clemente
Mission Viejo
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DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
REGIONAL LINE HAUL TRANSIT SYSTEM -
UNCONTSTRAINED DEVELOPMENT
EXISTING TRANSIT CORRIDORS (LACTC / OCTC)
CORRIDOR EXTENSIONS
HIGH CAPACITY DEMAND
MEDIUM CAPACITY DEMAND
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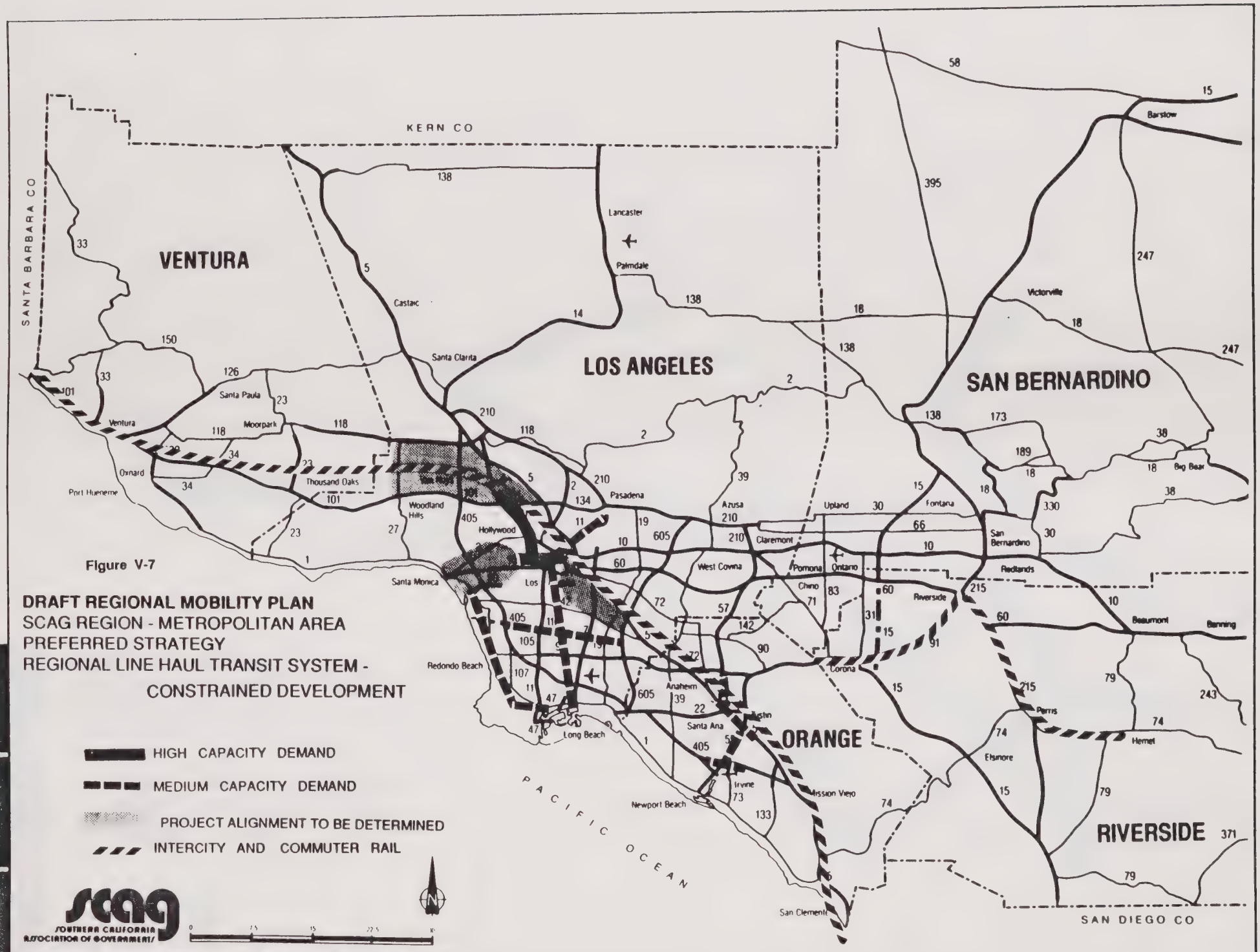
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Anaheim
Santa Ana
Long Beach
Irvine
Newport Beach
Mission Viejo
Corona
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San Clemente
Figure V-7
DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
REGIONAL LINE HAUL TRANSIT SYSTEM -
CONSTRAINED DEVELOPMENT
HIGH CAPACITY DEMAND
MEDIUM CAPACITY DEMAND
PROJECT ALIGNMENT TO BE DETERMINED
INTERCITY AND COMMUTER RAIL
SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

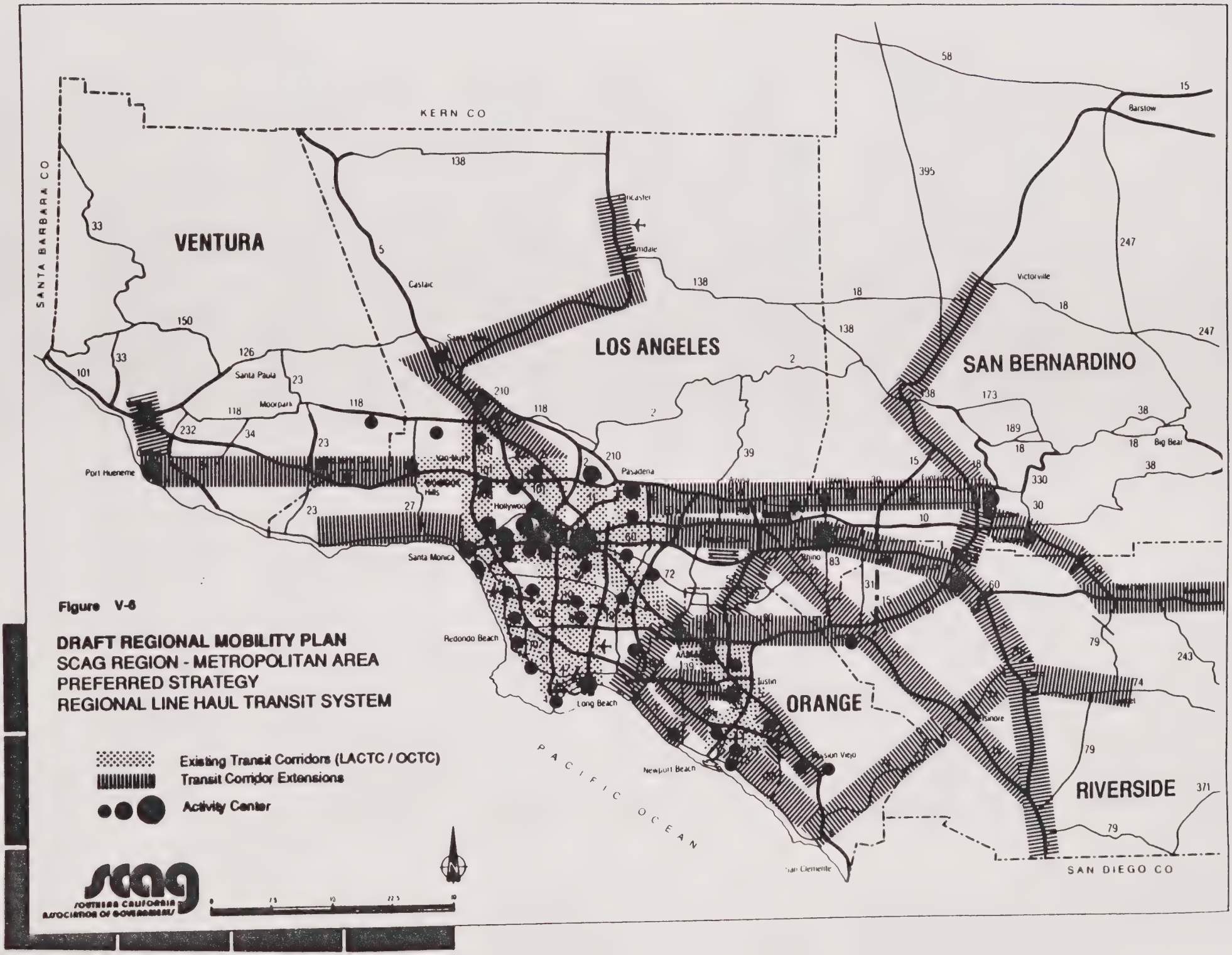

Figure V-6

DRAFT REGIONAL MOBILITY PLAN
SCAG REGION - METROPOLITAN AREA
PREFERRED STRATEGY
REGIONAL LINE HAUL TRANSIT SYSTEM

High-Occupancy Vehicle (HOV) Facilities. Currently, the SCAG region includes commuter lanes on three routes reserved for private vehicles of two or more occupants and buses: the El Monte Busway (I-10), the Artesia Freeway (SR-91), and the Costa Mesa or Newport Freeway (SR-55), as illustrated in Figure 3. The proposed plan would add 1,251 lane-miles of HOV lanes to freeways throughout the urban region including I-5, I-10, SR-14, SR-57, SR-60, SR-91/I-215, US-101, I-105, SR-110, SR-170, I-210/SR-30, I-405, I-605. In addition, all new corridors will be planned and built with HOV facilities (either adding or taking a mixed-flow lane for use as a commuter lane), except for the Norco Reach (I-15), which is already designed without such facilities.

Transit Facilities. The RMP proposes to increase transit usage from a current 6.6% of home-to-work trips to about 19% by 2010. This corresponds to an increase in transit mode share for work plus non-work trips from about 3% at present to 6% in 2010 region-wide. Ridership projections suggest 3.3 daily boardings for bus transit and an additional 15% of these transferring to rail.

To accomplish this, the transit element proposes to establish a regional line-haul system which would provide director service to all activity centers in the metropolitan area of the region, supported by feeder and local bus systems. The line haul system would include about 120 miles of high-capacity rail corridors and 240 miles of medium-capacity corridors.

The expansion of the bus fleet estimated for feeder and local bus systems to service forecast year-2010 ridership would add 3,100 peak-hour vehicles (an increase of over 90%) to the present fleet of 3,300, for a total bus fleet of 6,400 peak-hour vehicles (7,720 with spares). Rail and bus facilities would be supported by 112 added park-and-ride lots.

The Proposition A rail corridors in Los Angeles County, Orange County Transitway Corridors, and Riverside County proposed rail corridors are included in the medium-capacity network of improvements, shown in Figure 4.[12] High-capacity rail, under a scenario of constrained funding is only planned for the MetroRail routes in Los Angeles County - along the Wilshire Corridor from Union Station to Westwood, and from mid-Wilshire to the planned San Fernando Valley Lankersheim Station. Unconstrained additions to the high-capacity rail network include the I-10 corridor from Ontario to Santa Monica, the I-101/134 corridor from Burbank to Topanga Canyon, and the I-5 corridor

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[12] Proposition A, approved by Los Angeles County voters on November 4, 1980, increased sales taxes by one-half cent for the purpose of improving public transit in the county and to construct rail and rapid transit facilities. Of Prop-A revenues, 25% is returned to local jurisdictions, 35% is used by LACTC for the county-wide rail system, and 40% is allocated at the discretion of LACTC. Riverside County voters will decide on a similar measure in November 1988.

from Irvine to Glendale.

Intercity commuter rail includes the planned expansion of service on the San Diego-Santa Ana-Los Angeles-Ventura-Santa Barbara line, development of a San Bernardino-Anaheim line with potential connection to the proposed Los Angeles-Las Vegas Magnetic Levitation (MagLev) Rail Line, and additional development of a Orange County-Riverside-Hemet commuter rail connection. No additional intercity rail lines are proposed under the unconstrained funding scenario. The plan proposes formation of a Southern California Regional Commuter Rail Joint Exercise of Powers Agency (JPA) over the period 1989-1991 to implement commuter rail service and improvements for the five-county urbanized region.

Non-Motorized Transportation. The Regional Mobility Plan acknowledges that improvements in access to and facilities for bicycle and pedestrian modes of travel can result in local benefits of mitigating the need for automobile travel and reducing air pollutant emissions. The plan encourages the region's county transportation commissions and local governments to expend all TDA and other bikeway funding sources for facilities development and enhancement. The plan recommends that jurisdictions sponsor programs to promote bicycle and pedestrian modes.

Financing. The financial element of the RMP provides general estimates of facility construction, operation and maintenance costs and revenues based on existing funding sources. The financial requirements for 1992-2010 RMP implementation would result in a $36.45 billion capital shortfall, 86% ($31.5 billion) of which is due to transit capital costs versus revenues, as shown in Table 3. The O&M shortfall of $3.24 billion per year in the year 2010 is evenly split between transit facility and demand management program operations and maintenance.

The financial element recommends seven (7) primary approaches towards overcoming the projected funding shortfalls, as itemized in Table 4 and described below:

- Raising or instituting gas or sales taxes would require state enabling legislation in the form of removal of the Gann tax limit for these transportation funding needs. Although this measure would not in itself raise specific revenues, generation of more than half of the needed capital revenues is dependent on this action.

- Increasing state gas taxes and/or establishing a regional gas tax, and a complementary increase in county sales taxes earmarked for transportation improvements and operations comprise two actions which would raise over half the needed capital and some portion of operations and maintenance financing by the year 2010. A regional gas tax of about 5 cents/gallon or a state gas tax increases of about 7-17 cents/gallon could cover a substantial share of capital funding needs matched with

about a 0.5-1.0% increase in county sales taxes.

- Peak-period tolls on selected facilities could be use to cover over half of the region's facility operations and maintenance shortfalls by the year 2010. Increasing or establishing parking fees at work centers in the region could contribute 15-20% of both capital and O&M needs as well as providing TDM incentives.

- Transit benefit assessments along regional corridors could raise both capital and O&M revenues. By assessing non-residential development in urban areas and residential development in urbanizing areas, this measure can also perform as a job/housing balance incentive mechanism.

- Increased transit farebox recovery from added transit ridership would also contribute to both capital but primarily O&M revenues.

Table 3

FINANCIAL ELEMENT SUMMARY
REGIONAL MOBILITY PLAN, 1992-2010 ($1987, millions)

RMP Cost Item	Costs	Revenues	Shortfall	
Capital (18-Year Total)				
Highway	$13,560	$ 8,660	$ 4,900	36%
Transit	43,700	12,200	31,500	72%
Demand Management	50	-	50	100%
Capital Subtotal	**$57,310**	**$20,860**	**$36,450**	**64%**
Operation & Maintenance (Annual in 2010)				
Highway	70	70	-	0%
Transit	2,960	1,330	1,630	55%
Demand Management				
Ridership Maint.	1,510	-	1,510	100%
Vehicle Operation	250	150	100	40%
O&M Subtotal	**$4,790**	**$1,550**	**$3,240**	**68%**

Source: SCAG. Draft 1988 Regional Mobility Plan. Oct. 1988.

Table 4

FINANCIAL MEASURES TO MEET REVENUE SHORTFALLS
REGIONAL MOBILITY PLAN, 1992-2010 ($1987, millions)

RMP Financial Action Item	Capital Raised [a]	O&M Revenue [b]
1. **Remove Gann Limit for Transportation**	-	-
2. **Raise State / Add Regional Gas Tax**	$4,900-11,340	-
State 7.0-16.5 cents/gal		
Regional 5.7 cents/gal		
3. **Increase County Sales Taxes**	$11,800-16,190	$160
Los Angeles County 0.53-0.70%		
Orange County 0.64-0.90%		
Riverside County 0.57-0.68%		
S Bernardino County 0.55-0.67%		
Ventura County 0.90-1.04%		
4. **Peak-Period Tolls (AM and PM-Peaks)**	-	$50-4,520
10 cents/mile on selected facilities		
5. **Parking Fees at Employment Centers**	$6,480	$1,310
(up to specified amount per vehicle per day)		
Los Angeles County $8.14		
Orange County $5.33		
Riverside County $5.60		
S Bernardino County $3.77		
Ventura County $5.00		
6. **Benefit Assessments Along Transit Corridors**	$5,920	$250
Los Angeles County $0.49/sq.ft. non-residential		
Orange County $2.07/sq.ft. non-residential		
Riverside County $110.00/dwelling unit		
S Bernardino County $566.00/dwelling unit		
7. **Farebox Recovery**	up to $50	$1,210
TOTAL	**$33,540-35,670**	**$2,980-7,450**

(a) Total over 18 years (1992-2010). (b) Annual in the year 2010.

Source: SCAG. Draft 1988 Regional Mobility Plan. October 1988.

4. Environmental Analysis

4. ENVIRONMENTAL ANALYSIS OF THE PROPOSED PROGRAM

The Environmental Analysis section of the EIR assesses the proposed 1988 Regional Mobility Plan (RMP) program with regard to beneficial and adverse effects in the following twelve subject areas:

- o Mobility and Access
- o Air Quality
- o Energy Conservation
- o Geology and Seismicity
- o Biological Resources
- o Water Resources
- o Visual Resources
- o Noise
- o Cultural Resources
- o Social Impacts
- o Urban Form and Growth
- o Regional Economy

Each of these environmental subject area sections contains the following three subsections:

- o Regional Setting: A description of existing, pre-project conditions, and a summary of the policy and technical context necessary to discussion of project impacts.

- o Project Impact: An analysis of the beneficial and adverse effects of the proposed RMP program elements including, where appropriate, assessments of adverse impact significance relative to established criteria and thresholds (of existing conditions, under CEQA);

- o Recommended Mitigation: Wherever significant adverse impacts relative to existing conditions have been identified under Project Impact, appropriate and reasonable measures are recommended to minimize impacts.

4.A. MOBILITY AND ACCESS

REGIONAL SETTING

In 1984, the 11.9 million residents and 5.6 million employees of the urban region made 40.2 million trips daily, 18% of which were home-to-work trips. Average home-to-work trip lengths were 10.7 miles (22.5 minutes). Daily transit trips totaled 1,895,664 boardings in 1987 (a 2.7% mode share). Of 1984 home-to-work trips, 74.6% were drive-alone, 11.7% were in 2-person carpools, 7.1% were in 3+person carpools, and 6.6% rode public transportation. Freeway speeds averaged 40 mph in the morning peak (6:30-8:30 am) and 48 mph daily. Arterial speeds averaged 27 mph in the morning and 28 mph daily. Delay totaled 152,000 hours in the AM peak and 628,000 hours daily. Congested facilities (those operating at higher volumes than their capacity) comprised 221 lane-miles or 0.4% of the regional system; however 136 of these were congested freeway lane-miles - 2% of the regional freeway system.

PROJECT IMPACT

The purpose of the RMP is to improve mobility and access. The reasons for an analysis of mobility and access issues in the EIR are threefold: (1) to assess how well the plan achieves its objectives and to identify areas for improvement or mitigation; (2) to provide an assessment of beneficial effects of the plan against which to weigh potential adverse impacts in other environmental subject areas; and (3) because the mobility and access effects of the plan are basic to analysis of its effects on other subject areas. In addition, related Regional Strategic Plan component EIRs - especially the Growth Management Plan and Air Quality Management Plan - may rely on the RMP for mitigation of various significant impacts. The purpose of the Mobility and Access section is therefore informational.

The primary objective (see Section 3. Program Description - Goals) of the Regional Mobility Plan is to attain and maintain mobility in an environment of continuing population and economic growth. The second plan goal further clarifies that growth is an assumption of the RMP rather than a variable element, based on the analytical and policy efforts of the Growth Management Plan: To provide sufficient capacity for the transportation demands of people and goods given the adopted growth-management forecast.

Methodology. A principal tool for development of the Regional Mobility Plan is the SCAG Regional Transportation Model - a computerized representation of travel in the urban region which includes Los Angeles, Orange and Ventura Counties, and the western urbanizing portions of Riverside and San Bernardino Counties. The model is based on the federal Urban Transportation Planning System (UTPS) package of programs which use networks and matrices to represent transportation facilities and trips, respectively.

Highway networks specify the location, base speed, capacity, number of lanes, etc. for freeways and surface streets in the urban region; a 1984 highway network includes over 10,000 links representing roadway segments. Transit networks specify the mode, line, headway, etc. for fixed-route transit buses and rail lines in the urban region; the 1984 transit network represents almost 15,000 route-miles of transit facilities in the region.

Trip matrices for 1,285 analysis zones and 30 external connections identify the purpose, origin, destination, mode and time of day of trips within the urban region, as well as trips passing through the region, from or to locations outside the region. The model focuses on light and medium duty vehicles - passenger cars and vans; aside from transit buses, trucks are not explicitly taken into account. Key model inputs are socio-economic and land use data, transportation networks, and model calibration factors; model results include networks loaded with trips, indicating system performance in terms of speeds, level-of-service, delay, etc. Before the model is applied to developing future-year forecasts, base-year runs are compared to monitored data such as roadway volumes, speeds and transit ridership. The 1988 RMP uses a base year of 1984 and forecast year of 2010.

System Performance and Mobility. The effect of the Draft Regional Mobility Plan would be to maintain mobility at equal to or better than 1984 levels with regard to a variety of indicators. Although travel would increase due to regional growth, speed and percent delay would remain at about 1984 levels of 6-7 minutes of delay per hour of travel, compared to the without-plan alternative of over 30 minutes of delay per hour of travel. Efforts to address peak hour deficiencies through demand management ridesharing, transit and work schedules programs would reduce morning peak miles of congestion from 452 in the base year to 280 in the year 2010. Table 5 additionally indicates the growth in transit usage expected as a result of the plan.

Table 5

1988 REGIONAL MOBILITY PLAN: PERFORMANCE INDICATORS
SCAG URBAN REGION (Daily, unless otherwise noted)

Criterion	1984 Base	2010 Without Plan	2010 With Plan
Travel			
Vehicle Miles (1,000 VMT)	221,292	376,187	284,382
Vehicle Hours (1,000 VHT)	6,343	19,575	7,850
Delay			
Hours (1,000)	629	10,132	899
Percent of VMT	10%	52%	11%
Speed (mph)			
All facilities	35	19	36
Freeways	47	24	45
Congested facilities (miles)			
AM-Peak	452	2,564	280
PM-Peak	856	4,567	612
Transit Ridership			
Home-to-Work Trips (1,000)	477	527	1,401
Percent of Home-to-Work Trips	6.6%	5.1%	19.4%

Source: SCAG. Draft Regional Mobility Plan. September 1988.

Demand Management and Centers. The Regional Mobility Plan focuses on managing commuter travel to reduce peak facilities needs. A combination of alternative work weeks (4/40 and 9/80 schedules) and telecommuting would reduce home-to-work person trips in the urban region by over 3 million from a potential 2010 level of 10.3 million, as shown in Section 9 - Appendix, Table 29.

In addition, the effects of SCAQMD Regulation XV, SCAG Centers Rideshare Goals and Transit Ridership Objectives would nearly triple transit ridership and increase average vehicle ridership (AVR) by over 20%. Ridesharing increases would be highest for work locations in Los Angeles County, and are most pronounced in the region's 66 centers, where the TDM measures increase AVR over 40% from 1.32 to 1.88.

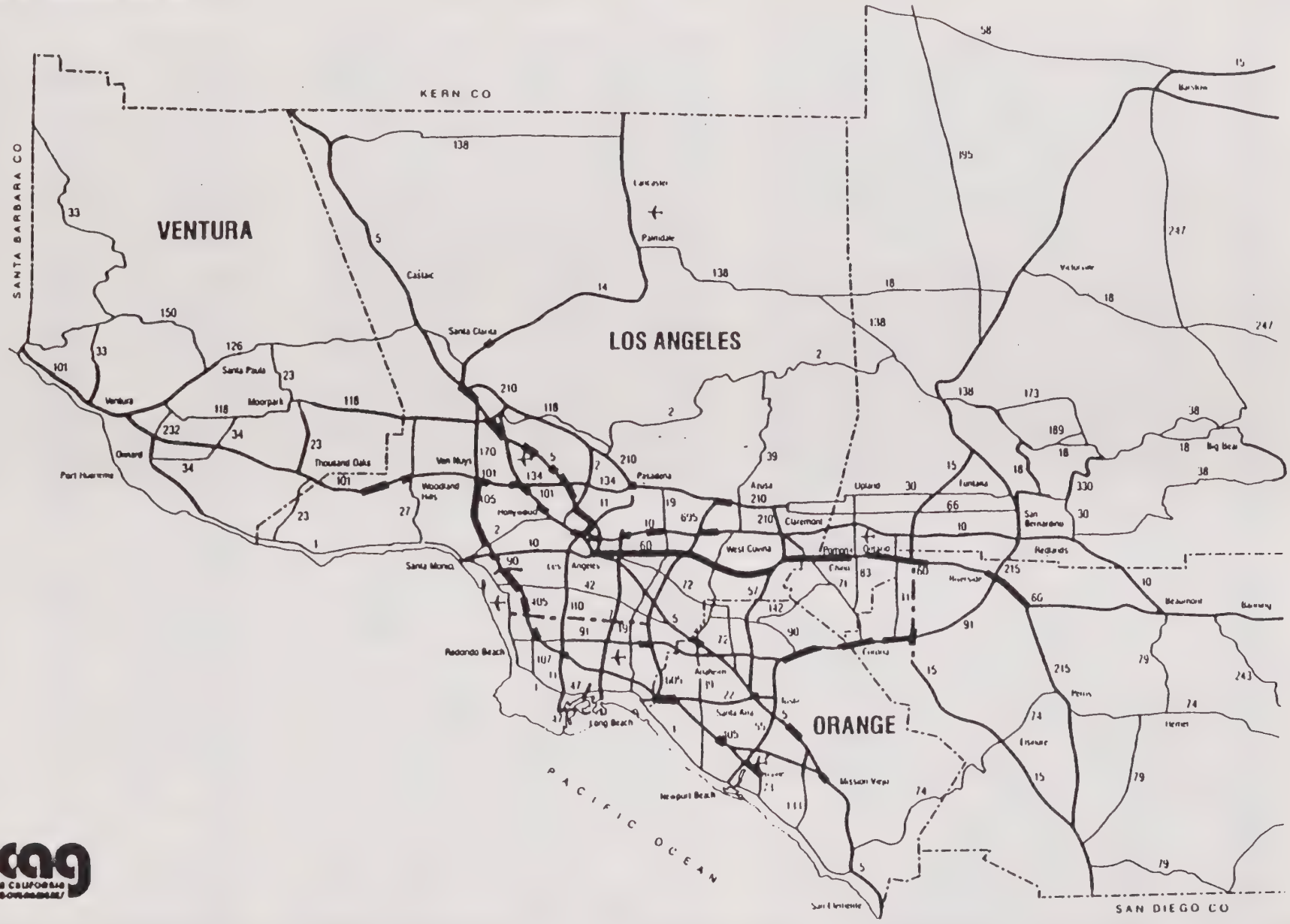
TDM measures and substantial investments in transit facilities would boost transit ridership throughout the urban region, with the greatest percentage increases in ridership access work locations in non-centers and outlying counties (transit modesplit to non-centers in western San Bernardino County increases over nine times, from 1% to 11%), and greatest gross increases in centers and highly urbanized subregions (transit modesplit to Los Angeles County centers shifts from 16% to 45%).

Roadway Facilities Improvements. Primary criteria for measuring performance of the regional transportation system involve roadway flow: speeds, miles of congested roadways, vehicle hours of delay and percent delay. The RMP recommends actions towards addition of 1,846 lane-miles of new and expanded mixed-flow facilities, and 1,251 lane-miles of added high-occupancy vehicle facilities. The RMP in tandem with the AQMP recommends addition of 600 freeway ramp meters, synchronization of over 8,000 signalized intersections, and physical improvement of 500 intersections to reduce vehicle-hours of delay.

The RMP would improve system performance over 1984 levels with regard to several criteria, despite the forecast growth of GMA-4MJH. Morning peak speeds would increase from 40 to 45 mph on freeways, and from 27 to 29 mph on surface streets for 1984 and 2010, as detailed in the Appendix, Table 30. Although RMP roadway improvements would result in highly effective reductions in percent delay for freeways in Los Angeles, Orange and Ventura Counties, similar projects are required in Riverside and San Bernardino Counties. In Riverside County, percent delay would increase from 11% to 21% on freeways, and from 3% to 12% on surface streets.

Miles of congested roadway would decline from current to 2010 levels under the RMP. Facilities over capacity (at level-of-service F) would drop from 221 to 149 lane-miles in the morning peak, and from 422 to 340 lane-miles in the evening peak despite regional growth, due to RMP facility and demand measures. However, remaining congestion would be concentrated on segments of the Pomona Freeway (SR-60), the Riverside Freeway (SR-91), the San Diego Freeway (I-405), and the Golden State Freeway (I-5), as shown in Figure 6. These routes may require additional transportation improvements.

The eastern SCAG region, including the mountain and desert portions of San Bernardino and Riverside Counties and all of Imperial County, are programmed for roadway improvements to address safety and capacity deficiencies. The Coachella Valley Area Transportation Study assessed capacity needs in outlying Riverside County, which are supported by the



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LEGEND:

AM-PEAK
VOLUME/CAPACITY > 1.0

Figure 6
CONGESTION:
2010 WITH-RMP

Caltrans District 8 System Management Plan.[13] The upgrade of SR-86 to control access should reduce safety risks along this route in Riverside and Imperial Counties.

Traffic intrusion region-wide - a key mobility and environmental concern discussed relative to the Baseline Projection (GMA-1) of the RMP needs assessment analysis - is addressed through the proposed RMP program. Increasingly, traffic on congested freeways and arterials is diverting to alternate routes which were not designed for, and are incompatible with, high traffic volumes. In the urban region in 1984, 54% of morning peak vehicle-miles traveled (VMT) was on surface streets - a figure which was fairly constant across the region's counties. In 2010, under GMA-1 growth and Existing-plus-Funded facilities, the surface street share of traffic would increase, especially in San Bernardino, Riverside and Orange Counties (Appendix, Table 30). A freeway construction-intensive approach would be effective at reducing traffic diversion, decreasing the arterial share of VMT to 36%; the capital and environmental costs of such an approach are discussed in the alternatives evaluation. With regard to the proposed plan, even though the GMA-4MJH growth forecast would result in shorter trip lengths and more local traffic due to improved job/housing balance, the RMP would result in a significant decline in diversion and traffic intrusion, with the surface street share dropping to 44% of AM-peak traffic.

Mixed-flow improvements for ports access would result in beneficial effects to local traffic circulation. The improvements would reduce traffic congestion through greater separation of goods-movement traffic from general travel. Although the rail corridor consolidation program would result in longer or more frequent trains on fewer rail corridors, this strategy would increase opportunities for grade separation of crossings. In those local cases of crossings with only moderate increases of vehicle delay which do not warrant grade separation, lower-cost mitigation measures such as roadway realignment have been recommended.

System management programs and actions are expected to result in improved local street and road system operational efficiency and reduced local congestion. Ramp metering and HOV ramp-meter bypass lane actions would result in improved traffic flow on freeways. To minimize a shifting of congestion from freeways to local streets from queuing, adequate storage should be designed into ramps at the time of meter design and installation. Incident response programs would also reduce nonrecurrent congestion and improve speeds on freeways and local streets wherever applied.

Public Transportation and Ridership. The RMP calls for actions towards implementation of two commuter rail lines, 120 miles of high-capacity rail corridors and 240 miles of medium capacity corridors. The expansion of the bus fleet for feeder and local bus systems to support anticipated year-2010 ridership would add 3,100 peak-hour vehicles (an increase of over 90%) to the

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[13] SCAG. Coachella Valley Area Transportation Study. December 1987.

present fleet of 3,300, for a total bus fleet of 6,400 peak-hour vehicles (7,720 with spares). Rail and bus facilities would be supported by 112 added park-and-ride lots. Operation of extensive rail facilities combined with TDM measures encouraging public transportation would almost triple transit ridership in the urban region, from 525,000 (5%) without TDM to 1,401,000 (19%) home-to-work transit trips with the RMP TDM measures, as Table 5 shows. This compares to 477,000 (6.6%) linked home-work transit trips in 1984.

Although the transportation analysis does not allow for separation of the beneficial effects on congestion relief of increased transit ridership separate from other TDM components, shifting one million automobile commuters to bus and rail must improve regional speeds and reduce delay, especially in and around employment centers. However, increased transit service and ridership may have local secondary effects which should be minimized through proper design of programs and improvements. Adequacy of transit station access and feeder services must be assessed at the project level. Local jurisdictions and transit operators should additionally cooperate to identify opportunities for bus bays, turnouts and signal pre-emption on priority routes. Local effects of increased commuter rail service on at-grade rail crossings would be dealt with through the specific program design and environmental review processes for each line.

Transit Dependency. As detailed in the Social and Growth sections of the EIR, the Growth Management Plan forecast indicates higher percentages of transit-dependent populations in the region, compounding the mobility need for public transportation with an access need. Aside from Los Angeles County, percentages of households with no vehicle would increase, led by San Bernardino, Riverside and then Orange Counties. The western San Bernardino County increase from 6.3% of households in 1984 to 7.7% in 2010 would be a 22% increase in the proportion of transit-dependent households due to a 150% gross increase in numbers of households with no vehicle. Clearly, provision of expanded service would be a beneficial effect for this population. However, increased fares associated with Financial Element Strategy 7 may result in a adverse impact disproportionately affecting the transit dependent. Economic assistance services and employer TDM subsidies providing bus passes at discounted or fully subsidized levels should reduce these effects. An on-going study at SCAG on the social impacts of TDM will further explore these issues.

Secondary Effects of TDM. Parking management is a common component to implementation of SCAQMD Regulation XV, achieving SCAG Centers Ridesharing Goals, and providing automobile disincentives necessary to boosting transit ridership. Parking policies would include the following:

- New fees or increased rates for employee and other parking,
- Increased on-street parking meters and rates,
- Reductions in on-street parking,
- Other reductions in parking supply,

- o Reserved preferential parking for ridesharers,
- o Peripheral parking and shuttle services, and
- o Increased enforcement of illegal parking: ticketing and towing.

One potential side effect of many of these parking disincentives can be increased spill-over of parking from employment centers to nearby residential neighborhoods. In some cases, major employers who were providing free parking to employees will implement parking fees as part of their Regulation XV or other commuter incentive program. Other employers may provide a transportation allowance to employees, which employees can use to pay for parking, or pocket if they bicycle, carpool, etc. However, if the local jurisdiction in which the employer is located is not told about these changes and does not restrict parking on nearby local streets, as pressure on employees increases with regard to parking at workplaces, some percentage will inevitably seek refuge on residential and other streets, potentially resulting in protests from local residents.

Transit passes, tokens and subsidies comprise an additional TDM strategy that employers may use, which may require improved public-private coordination and communication. In fulfilling their Regulation XV responsibilities, major employers may provide free or subsidized bus passes to employees, and retail and service businesses may provide bus tokens to customers and clients (for instance, hospitals and clinics may provide bus tokens to patients). Potential riders may get discouraged, if transit operators are not apprised early by businesses of local actions which may result in sudden increases in transit demand and therefore cannot adjust to provide necessary service.

RECOMMENDED MITIGATION

Since the RMP results in overall significant beneficial effects on mobility and access region-wide, no mitigation measures are recommended. The few adverse effects discussed above are all local in nature and do not require mitigation as they are not considered regionally significant.

4.B. AIR QUALITY

REGIONAL SETTING

Air pollution is a major problem in Southern California, and transportation activities are a significant contributor to this problem.

The physical traits of the area - the geography, the warm, sunny climate, the lack of strong winds, and other meteorological characteristics - make large areas of Southern California particularly susceptible to the type of air pollution commonly called "smog". Despite a long history of increasingly stringent controls on emissions from industry and motor vehicles, they continue to be generated at levels that result in violations of federal and state clean air standards throughout the region, thus producing adverse health effects on the region's population. Photochemical oxidants, ozone in particular, pose the most serious air pollution problem, with maximum ozone readings significantly exceeding federal ambient air quality standards.

Portions of three separate air basins lie within the SCAG region - the South Coast, South Central Coast (Ventura County) and Southeast Desert Air basins, shown in Figure 7. Each basin's existing air quality conditions are described below, followed by an inventory of pollutant sources (emissions) in each basin and a discussion of current planning efforts. Automobile emissions presently contribute the majority of all transportation emissions for several pollutants: reactive organic gases and nitrogen oxides (which together are precursors of ozone), and carbon monoxide in all three basins.

The South Coast Sir Basin (SoCAB), the most seriously affected portion of the region, contains over 90% of the region's population. Air quality conditions and problems of the SoCAB are emphasized below.

Existing Air Quality Conditions. Although significant progress has been made in reducing high concentrations of pollutants in the South Coast Air Basin, air pollution remains a serious problem. Federal and state air quality standards established to protect public health are frequently exceeded in many areas of the basin. Air quality conditions in the basin during 1985 are summarized below for five primary pollutants:

Ozone. Both federal and state O_3 standards were exceeded throughout the Basin, with the worst location - Glendora - exceeding federal and state standards on 141 days and 187 days, respectively. The highest hourly concentration recorded in the basin was 0.39 parts-per-million (ppm) - also at Glendora - over three times the federal standard of 0.12 ppm set to protect public health.

Carbon Monoxide. Densely populated parts of Los Angeles and Orange counties where vehicular traffic is concentrated exceeded the federal and state one-hour and eight-hour average CO standards. At the worst location - Lennox - the federal and state eight-hour standards were exceeded on 46 and

VENTURA

LOS ANGELES

SAN BERNARDINO

(SEE INSET)

RIVERSIDE

ORANGE

SAN BERNARDINO

RIVERSIDE

IMPERIAL

SCALE IN MILES

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

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0 10 20

SCALE IN MILES

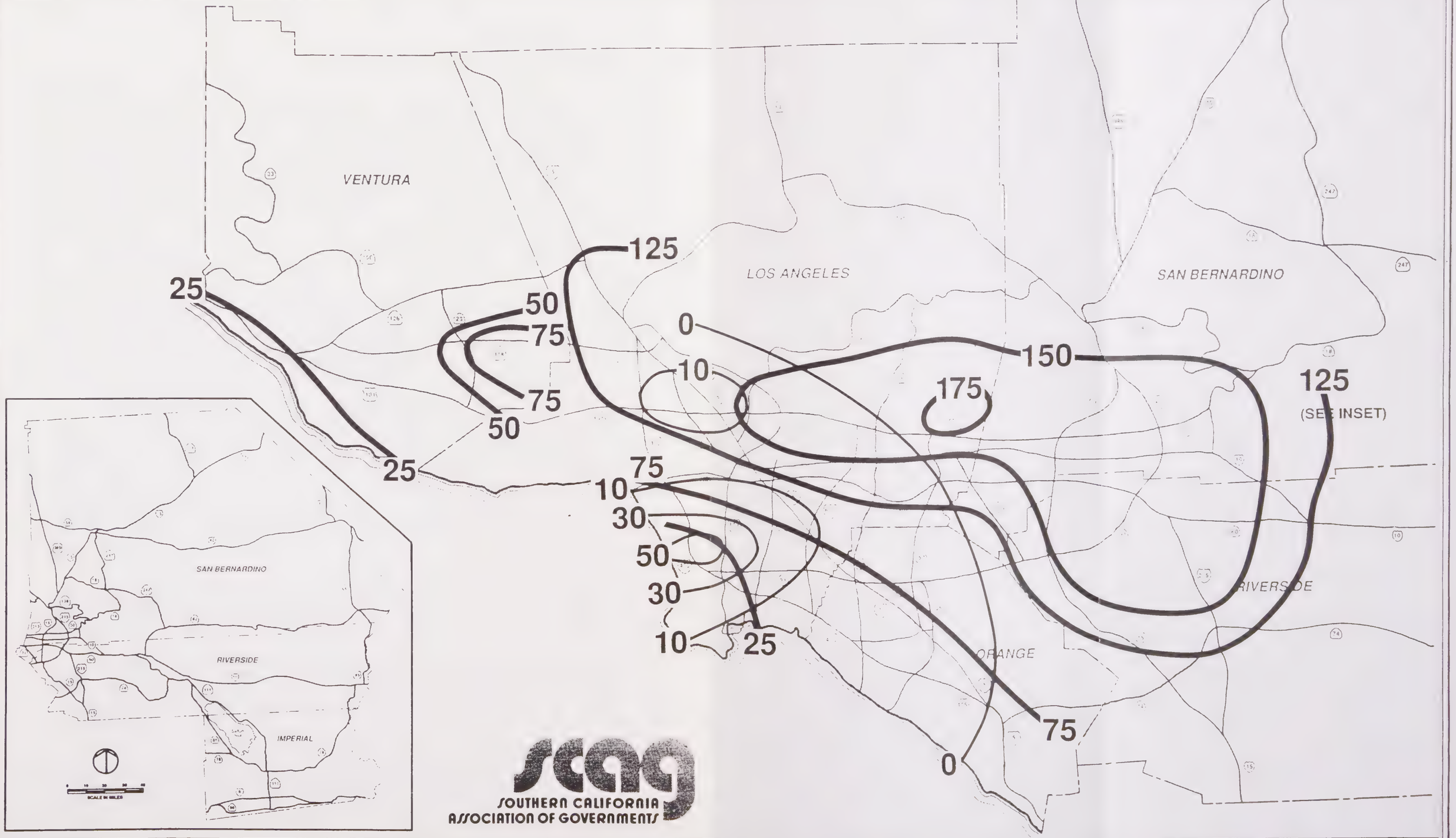
LEGEND:

BASIN BOUNDARY

MONITORING STATION

Source: CARB, 1987.

Figure 7
AIR BASINS AND MONITORING



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Planning Consultants Research

0 10 20
SCALE IN MILES

Source: CARB, 1986.

LEGEND:

OZONE
CARBON MONOXIDE

} NUMBER OF DAYS ON WHICH STATE AIR QUALITY STANDARD WAS EXCEEDED (1985)

Figure 8
AIR QUALITY STANDARD EXCEEDANCES (1985)

51 days, respectively. The state one-hour standard was exceeded 12 days, with a maximum one-hour concentration exceeding the state 20 ppm standard by 45%.

Nitrogen Dioxide. The annual federal NO_2 standard was exceeded at 8% of monitoring stations in the Basin (8% of the Basin). About 27% of the Basin exceeded the state one-hour standard one or more days in 1985, particularly in coastal and central Los Angeles County; it was exceeded on 4 days at the worst two locations, Long Beach and Pico Rivera. The single highest hourly average NO_2 concentration was 0.35 ppm, reported at Pico Rivera - 40% over the state standard.

Sulfur Dioxide. Neither the federal nor the state SO_2 standard was exceeded in 1985.

Suspended Particulates. Concentrations of total suspended particulates (TSP) exceeded the federal standard of 150 ug/m^3 in 97% of the Basin. The state standard for inhalable particulates (PM_{10}, particulates with a diameter of 10 microns or less) was exceeded at all PM_{10} monitoring stations in the Basin, with the highest number of exceedances being 47 days at the Riverside-Rubidoux station and 46 days at the Reseda station.

Ventura County (South Central Coast Basin). High concentrations of ozone and particulates are the most critical air quality problems in Ventura County. Standards for these two pollutants have been frequently exceeded throughout the County. The federal ozone standard was exceeded on 35 days at Simi, down from a 1978 high of 91 days; concentrations reached 0.19 ppm. Federal TSP standards were exceeded on 1-3 days basinwide, with the maximum concentration of three times the standard observed at Ventura. State PM_{10} standards were exceeded on 19 days basinwide, 14 of which were at Simi, where levels peaked at two-and-a-half times the state standard of 50 ug/m^3. Standards for the other criteria pollutants are infrequently exceeded, or not violated at all.

Under typical meteorological conditions, there is some air pollutant transport between Ventura County and the South Coast Air Basin. Occasionally, however, daytime winds from the south and east transport pollutants from Los Angeles County north and westward into Ventura and Santa Barbara counties.

Southeast Desert Air Basin (SEDAB). The major share of the Southeast Desert Air Basin's air pollution problems occur in the southwestern section of the basin, which adjoins the South Coast Basin. However, the remaining portion of the basin also experiences air pollutant concentrations in excess of standards.

As in Ventura County, the two most serious air pollution problems are photochemical oxidants and particulates. Inversion layers, which trap smog in the Los Angeles Basin, are usually absent from the mountain and desert areas. However, air pollution is transported from the South Coast Basin and

contributes to high oxidant concentrations in the basin's southwest areas.[14] At the worst locations, Lancaster in north Los Angeles County and Banning in Riverside County, the federal ozone standard was exceeded on 58 and 55 days, respectively. Particulate standards frequently have been exceeded throughout the SEDAB, with the most prevalent locations being El Centro in Imperial County and Indio in Riverside County, exceeding 60% and 65% of days sampled, respectively.

Pollutant Sources. An updated 1985 inventory of air pollutants emissions in the South Coast Air Basin was prepared for the 1988 Air Quality Management Plan. Table 6 summarizes emissions from both stationary and mobile sources. Reported pollutants are: reactive organic gases (ROG, which includes hydrocarbons and other ozone-forming carbon-based gases), carbon monoxide (CO), nitrogen oxides (NOx), sulfur oxides (SOx), and suspended and inhalable particulates (TSP and PM_{10}).

Table 6
EMISSIONS SOURCE INVENTORY
SOUTH COAST AIR BASIN (1985, TONS/DAY)

Source	ROG	NOx	SOx	CO	TSP	PM10
Stationary Sources						
Fuel Combustion	17	254	18	67	11	10
Waste Burning	1	1	1	4	1	1
Solvent Use	382	-	-	-	1	1
Petroleum Processing	81	10	27	3	4	3
Industrial Processes	24	9	8	6	17	12
Miscellaneous Processes	85	11	2	110	1,514	652
Subtotal	**590**	**285**	**56**	**190**	**1,548**	**679**
Mobile Sources						
On-Road Vehicles	578	620	35	4,752	84	50
Other Mobile	78	135	30	488	13	12
Subtotal	**656**	**755**	**65**	**5,240**	**97**	**62**
TOTAL ALL SOURCES	**1,246**	**1,040**	**121**	**5,430**	**1,645**	**741**

Source: SCAQMD and SCAG. Draft AQMP. September 1988.

[14] CARB. The Impact of Transport from the South Coast Air Basin on Ozone Levels in the Southeast Desert Air Basin. Prepared by FH Shair, et al, California Institute of Technology, 1983.

Mobile emissions consist of both "on-road" emissions from automobiles, trucks, motorcycles, buses, and "other" mobile emissions, including aircraft, railroad operations, commercial shipping, pleasure boats, and off-road vehicles used for construction, recreation and agriculture. Transportation facilities and services have major effects on the region's air quality because all contribute more emissions than stationary sources for several major pollutants - nitrogen oxides, reactive organic gases, and carbon monoxide, shown in Figure 9. Of all transportation sources, automobiles (light duty passenger vehicles) contribute the most emissions for nearly all pollutants.

Current Air Quality Policy Efforts. The entire South Coast Air Basin, the southern half of Ventura County and portions of the Southeast Desert Basin are all designated Air Quality Maintenance Areas (AQMAs) because federal standards currently are not met for certain pollutants. Federal and state laws require that Air Quality Management Plans (AQMPs) be developed for these AQMAs with implementable and enforceable strategies and measures for achieving and maintaining air quality standards by specified dates. Areas that cannot achieve air quality standards solely through controls on stationary sources for carbon monoxide and ozone are required to adopt control strategies for transportation sources of pollution in their plans.

SCAG and SCAQMD prepared an AQMP for the SCAB in 1979, and updated and revised it in August 1982 to provide further needed controls for ozone and carbon monoxide. Approved by the ARB, the plan included over 100 short-range tactics to control stationary and mobile emission sources; however, since the plan did not schedule attainment of federal ozone and carbon monoxide standards by 1987, the US EPA disapproved the AQMP in January 1988.

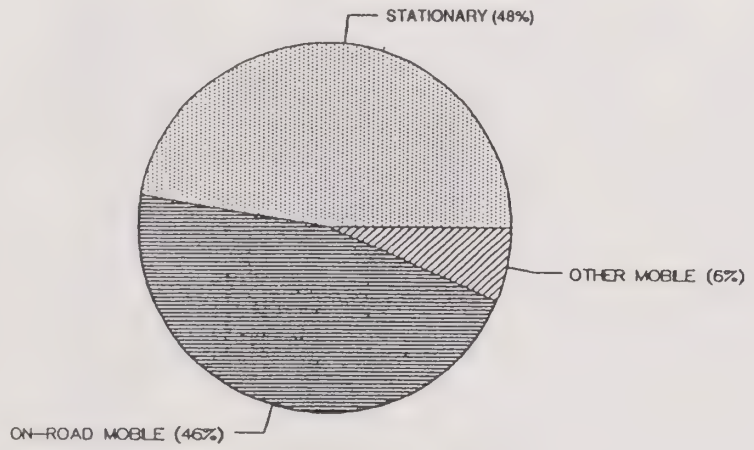
Most recently, SCAG and SCAQMD have prepared a 1988 Draft AQMP with three tiers of control measures. Tier 1 measures are implementable given current technology; Tier 2 measures require advancement of current technology and vigorous regulatory intervention; and Tier 3 measures require development of new technology. Full implementation of Tier 1 measures would result in attainment of state and federal CO standards by 2010, as shown in Figure 10. Tier 2 measures would achieve attainment of the federal PM_{10} standard. Tier 3 would bring most parts of the Basin to attainment of federal O_3 standards.

AQMPs also have been developed for Ventura County and the SEDAB. The Ventura plan, first prepared in 1979 and updated in 1982, was amended in February 1988 to update and add transportation control measures. The SEDAB plan, prepared by the Air Resources Board in 1979, has not been revised, and contains no TCMs.

The federal Clean Air Act requires that there be conformity of transportation plans, programs and projects with the State Implementation Plan (SIP), which contains the local AQMPs. This requirement is meant to create a mutually supportive air quality/transportation planning process. Transportation plans, programs, and projects are judged in conformity with

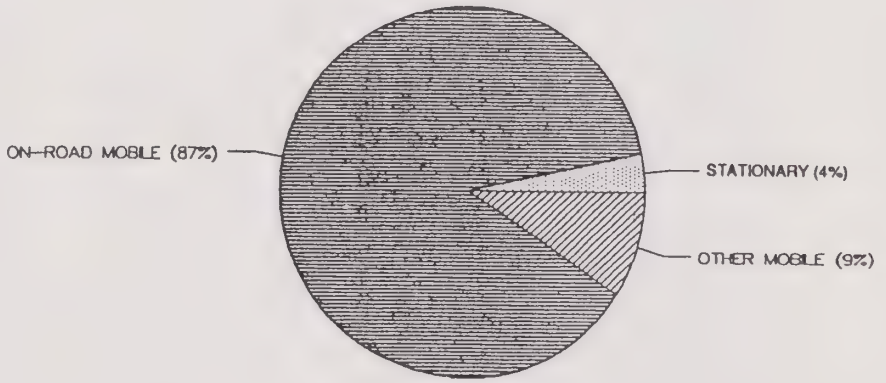
Reactive Organic Gas Sources, 1985

Total Emissions = 1,246 tons/day



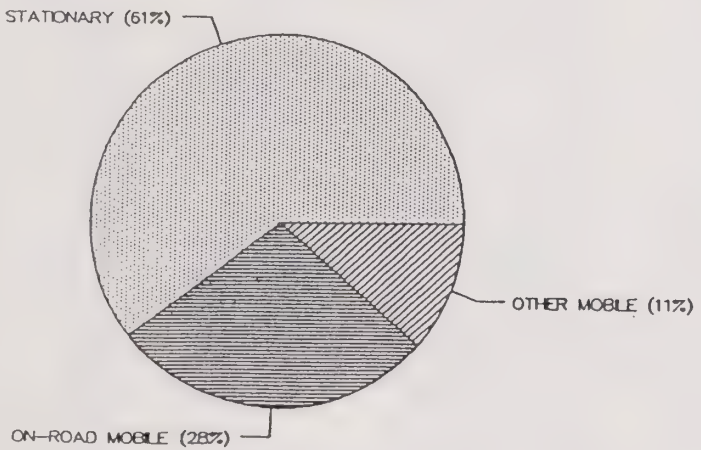
Carbon Monoxide Sources, 1985

Total Emissions = 5,430 tons/day



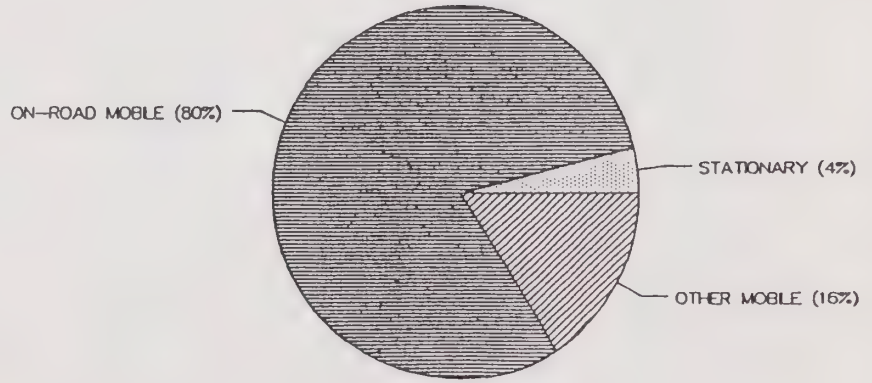
Reactive Organic Gas Sources, 2010

Total Emissions = 1,154 tons/day



Carbon Monoxide Sources, 2010

Total Emissions = 4,924 tons/day



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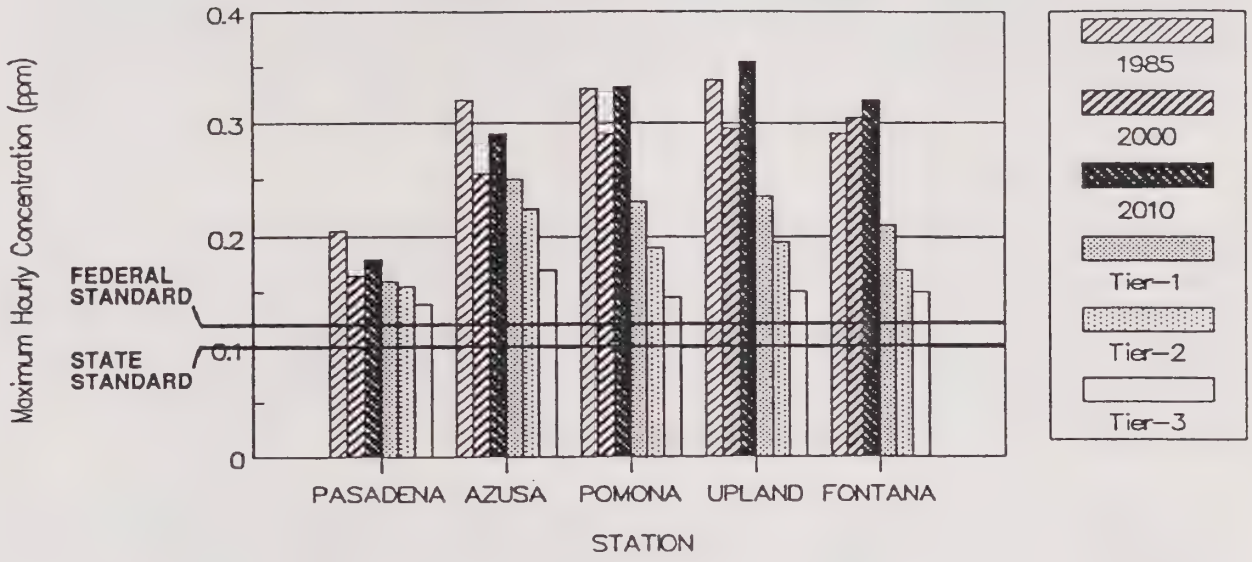
Source: SCAQMD 1988

Figure 9
AIR EMISSION SOURCES

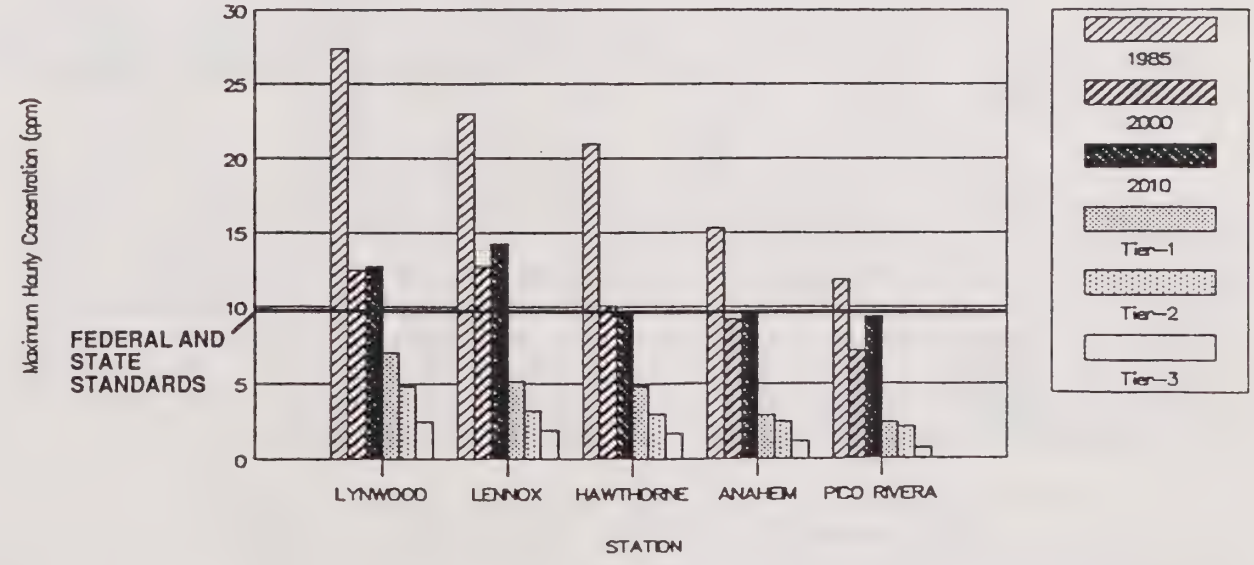
Ozone

AQMP Projected Concentrations



Carbon Monoxide

AQMP Projected Concentrations



Planning Consultants Research

Source: SCAQMD 1988

Figure 10
AIR POLLUTANT FORECASTS

the SIP if they contribute reasonable progress in implementing the SIP's TCMs; if they do not adversely affect air quality; or if the AQMP endorses them. Further, AQMPs must contain specific procedures for determining consistency of plans, programs and projects with the AQMP. Most recently, US EPA has indicated that, to comply with the Clean Air Act, it has been directed to develop a Federal Implementation Plan (FIP) with specific control measures for the South Coast Basin.

PROJECT IMPACT

The RMP and AQMP have been developed in tandem through iterative processes to result in plans which conform with each other on a policy level and which agree as much as possible on a technical level. Therefore, changes emissions expected as a result of the RMP have been included in the AQMP. Of course, RMP emissions make up only one part of the total emissions of the AQMP, however similar levels of effort are planned for stationary source emissions as for transportation sources.

Year 2010 emissions and emission reductions with the RMP and AQMP indicate the successively more stringent levels of control under the various AQMP tiers. Tier 1 results in a 61% reduction in carbon monoxide emissions by the year 2010, as shown in Table 7, and accompanying attainment of state and federal standards, with maximum CO levels at Lennox station dropping to almost one-half standards, as shown in Figure 10. Stationary source CO emission reductions may be optimistic, given that they exceed 2010 Baseline emissions.

Tier 1 control measures are estimated to cost $8 million per day ($1987); by 2010 this would represent an average cost per Basin resident of 65 cents per day. In comparison, daily Basin air pollution damage to health, property, forests and agriculture cost $26 million or two dollars per capita in 1987, solely based on the effects of ozone and particulates standards nonattainment.[15]

Tier 2 control measures would achieve additional emission reductions over Tier 1 measures to further close the gap between Basin concentrations and standards for ozone and particulates within the next ten to fifteen years. The substitution of methanol for diesel fuels would result in a net increase in mobile ROG emissions of 5% over Tier 1 emissions (see Table 7), however the lower reactivity of these increased ROG emissions should result in continued decline in ozone levels, as indicated in Figure 10. Tiers 1 and 2 control measures' cumulative effect is expected to achieve CO, NO_x, SO_x, and PM_{10} emission reductions necessary to meeting health standards.

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[15] SCAQMD and SCAG. Draft Air Quality Management Plan. September 1988.

Tier 3 control measures take further steps towards meeting ozone standards through applications of currently unavailable technologies in the following three areas: (1) non-reactive solvents for surface coatings and solvent use; (2) very low emitting passenger vehicles; and (3) clean fuel for heavy duty vehicles. Stationary source reductions would result for ROG only - eliminating 63% of remaining ROG after Tiers 1 and 2. Mobile source emission reductions would occur across the board, and most parts of the South Coast Basin would attain federal ozone standards.

Table 7

FUTURE EMISSIONS INVENTORY AND REDUCTIONS
SOUTH COAST AIR BASIN (2010, TONS/DAY AND %-REDUCTION)

Source		ROG	NOx	SOx	CO	TSP
2010 Baseline						
Stationary Sources		699	271	71	205	2,298
Mobile Sources		455	762	69	4,719	128
Total All Sources		**1,154**	**1,033**	**140**	**4,924**	**2,426**
Tier 1 Emissions						
Reductions:	Stationary	58%	79%	86%	134%	32%
	Mobile	54%	49%	23%	57%	34%
Remaining:	Stationary	294	57	10	-70	1,564
	Mobile	211	390	53	2,011	85
	All Sources	**505**	**447**	**63**	**1,941**	**1,649**
Tier 2 Emissions						
Reductions:	Stationary	46%	40%	70%	36%	18%
	Mobile	-5%	16%	19%	10%	4%
Remaining:	Stationary	159	34	3	-95	1,285
	Mobile	221	329	43	1,818	82
	All Sources	**380**	**363**	**46**	**1,723**	**1,367**
Tier 3 Emissions						
Reductions:	Stationary	63%	-	-	-	-
	Mobile	36%	37%	40%	60%	7%
Remaining:	Stationary	59	34	3	-95	1,285
	Mobile	141	207	26	722	76
	All Sources	**200**	**241**	**29**	**627**	**1,361**

Source: SCAQMD and SCAG. Draft AQMP. (On-road mobile is based on annual average EMFAC7D), September 1988.

Transportation Sources. Although on-road mobile sources contributed more than half of the South Coast Basin's ROG emissions and most of the CO emissions, elimination of mobile sources would still not result in attainment. Therefore, efforts towards attainment require a combined approach.

The greatest single cause for emission reductions from transportation sources is fleet turnover. Newer cars are more fuel efficient and must meet more stringent new-car emission standards; as older cars wear out and are replaced with new cars, a greater percentage of the total vehicle population (or vehicle fleet) meets new-car emission standards. Fleet turnover will result in emission reductions of 66%-72% for ROG, NOx and CO, and 15% for TSP over the same travel taking place with base-year (1984) vehicles, as shown in the second page of Table 8. Except for two cases (CO in Riverside and TSP region-wide), fleet turnover emission reductions alone would result in continued decline in county emissions in the face of GMA-1 (Baseline) growth. Particulate emission reductions from fleet turnover are low since tire wear is the source of most of particulate emissions, rather than exhaust.

Baseline Growth would result in increased emissions for ROG, NOx and CO of about 10%-30%; however, Riverside CO would increase over 50% under GMA-1 growth and resultant congestion, as indicated in the second page of Table 8.

The results of proposed Growth Management actions, as forecast in the GMA-4MJH policy forecast would, in many cases cancel the emission impacts of 1984-2010 growth. Improved job/housing balance would contribute to shorter trip lengths, less VMT, and decreased congestion - all reducing emissions. Growth Management actions would have the least positive effect in Ventura County, as this is the only County for which both jobs and population were added to GMA-1 (Baseline) to improve job/housing balance for GMA-4MJH.

The results of the transportation actions of the RMP - TDM, TSM and Facility Development - would produce emission reductions also on the same order of the impacts of 1984-2010 growth. The RMP actions, aside from Growth Management, would result in year-2010 emissions reductions of 21% for ROG, 12% for NOx, 25% for CO, and 18% for TSP, as detailed in Table 8.

The Draft 1988 AQMP indicates that the bulk of transportation emission reductions would result from Tier-II measures, which correspond to the unconstrained RMP program. Under Tier-I implementation and constrained funding conditions, automobile emission reductions for the year 2010 would range from 2-6%; under AQMP Tier-II and the full RMP unconstrained program, year 2010 emission reductions would reach 26-66% from passenger cars.[16]

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[16] SCAG. Transportation, Land Use and Energy Conservation Measures. AQMP Appendix IV-G, September 1988.

Overall, the RMP would result in a net beneficial effect by decreasing emissions over 1984 levels. Emission reductions are expected to result in attainment of federal standards for most of the criteria pollutants (SOx, CO, TSP and PM10), and are therefore a significant beneficial effect. SCAG and SCAQMD should ensure that implementation of the RMP conforms with the adopted AQMP, for full attainment of standards for photochemical oxidants (ozone).

RECOMMENDED MITIGATION

As the RMP would contribute to a decrease in on-road emissions over 1984 levels, the overall effect of the plan is considered beneficial, and no mitigation measures are recommended. Nevertheless, SCAG, SCAQMD and adjacent air districts should continue cooperation to ensure that implementation of the RMP conforms with the adopted AQMP.

Table 8

ON-ROAD EMISSIONS AND REDUCTIONS
SCAG REGION (TONS/DAY)

	BASE 1984	GMA-1 E+F 2010[a]	GMA-4MJH 84EmFac 2010[b]	GMA-4MJH E+F 2010[c]	GMA-4MJH RMP 2010[d]
ROG					
Los Angeles	91.3	33.8	90.9	31.6	25.3
Orange	27.3	15.4	32.2	12.0	9.0
Riverside	10.6	11.6	23.4	8.2	6.4
San Bernardino	12.6	8.8	23.0	8.0	6.5
Ventura	6.9	2.7	8.8	2.8	2.5
Imperial	1.5	0.9	2.3	0.8	0.6
SCAG REGION	**150.2**	**73.3**	**180.6**	**63.5**	**50.4**
NOx					
Los Angeles	71.1	24.0	59.8	22.5	19.5
Orange	20.9	10.0	21.3	8.1	7.0
Riverside	12.4	10.5	22.3	7.8	7.0
San Bernardino	14.9	8.4	20.9	7.7	6.8
Ventura	5.5	1.9	5.8	1.9	1.9
Imperial	1.9	1.2	2.9	1.1	0.9
SCAG REGION	**126.6**	**56.0**	**133.0**	**49.1**	**43.1**
CO					
Los Angeles	723.0	381.1	784.0	342.3	264.7
Orange	215.9	189.1	275.9	137.5	93.5
Riverside	82.4	137.6	185.6	84.4	61.1
San Bernardino	99.0	91.1	174.4	77.0	59.4
Ventura	52.8	27.5	71.8	27.9	24.7
Imperial	11.7	10.0	18.0	8.1	6.1
SCAG REGION	**1,184.8**	**836.4**	**1,509.7**	**677.2**	**509.5**
TSP					
Los Angeles	8.8	10.7	9.7	10.1	8.2
Orange	2.5	4.3	3.4	3.6	2.9
Riverside	1.5	3.9	3.0	3.0	2.5
San Bernardino	1.9	3.0	2.7	2.8	2.3
Ventura	0.7	0.8	0.9	0.8	0.8
Imperial	0.2	0.4	0.4	0.4	0.3
SCAG REGION	**15.6**	**23.2**	**20.0**	**20.6**	**17.0**

(a) GMA-1 (Baseline 2010) with Existing+Funded system (No-RMP).
(b) GMA-4MJH (Growth Plan) with 1984 Emission Factors.
(c) GMA-4MJH with Existing+Funded system (no facilities or TDM).
(d) Proposed RMP: GMA-4MJH with facilities and TDM, etc.

(continued)

Table 8 (continued)

ON-ROAD EMISSIONS AND REDUCTIONS
SCAG REGION (TONS/DAY)

	County Share 1984	-- Sources of Emission Changes -- Growth Impact 2010	Fleet Turnovr 2010	Growth Actions 2010	RMP Actions 2010
ROG					
Los Angeles	60.8%	10.3%	-72.1%	-6.5%	-19.9%
Orange	18.2%	15.8%	-72.0%	-21.9%	-25.3%
Riverside	7.1%	30.1%	-72.5%	-29.3%	-21.5%
San Bernardino	8.4%	19.6%	-71.9%	-8.6%	-19.3%
Ventura	4.6%	11.3%	-71.7%	2.3%	-11.1%
Imperial	1.0%	18.1%	-72.1%	-13.4%	-20.6%
SCAG REGION	**100.0%**	**13.6%**	**-72.1%**	**-13.4%**	**-20.6%**
NOx					
Los Angeles	56.2%	11.0%	-67.4%	-6.1%	-13.4%
Orange	16.5%	15.7%	-67.4%	-18.9%	-14.3%
Riverside	9.8%	26.8%	-68.4%	-25.2%	-10.0%
San Bernardino	11.8%	18.2%	-67.7%	-9.1%	-11.8%
Ventura	4.3%	11.3%	-67.5%	1.0%	-1.4%
Imperial	1.5%	21.0%	-67.6%	-12.3%	-12.3%
SCAG REGION	**100.0%**	**14.3%**	**-67.6%**	**-12.3%**	**-12.3%**
CO					
Los Angeles	61.0%	17.8%	-66.2%	-10.2%	-22.7%
Orange	18.2%	29.7%	-66.1%	-27.3%	-32.0%
Riverside	7.0%	55.1%	-67.1%	-38.7%	-27.5%
San Bernardino	8.4%	31.3%	-66.0%	-15.5%	-22.9%
Ventura	4.5%	17.9%	-65.7%	1.5%	-11.7%
Imperial	1.0%	28.8%	-66.3%	-19.0%	-24.8%
SCAG REGION	**100.0%**	**23.8%**	**-66.3%**	**-19.0%**	**-24.8%**
TSP					
Los Angeles	56.3%	103.7%	-15.1%	-5.6%	-18.8%
Orange	16.3%	143.1%	-15.1%	-16.9%	-18.6%
Riverside	9.8%	218.6%	-15.1%	-24.4%	-14.8%
San Bernardino	12.0%	137.2%	-15.1%	-8.8%	-17.4%
Ventura	4.2%	108.2%	-15.1%	-0.4%	-7.6%
Imperial	1.5%	149.4%	-15.1%	-11.2%	-17.5%
SCAG REGION	**100.0%**	**126.3%**	**-15.1%**	**-11.2%**	**-17.5%**

Source: SCAG. Regional Transportation Model. DTIM with EMFAC7C Under Summer Conditions, Unpublished - August 1988.

4.C. ENERGY CONSERVATION

REGIONAL SETTING

The region's transportation needs are met almost exclusively through the use of petroleum-based fuels. This section focuses on recent trends in fuel energy consumption by the most prevalent form of transportation in the SCAG region, on-road vehicles (autos, trucks, buses, motorcycles), and by passenger rail. The setting also includes a discussion of trends in vehicle characteristics, as reflected in automobile fuel economy changes, and prospects for future supplies.

Vehicle Fuel Consumption. In 1984, the SCAG region consumed about 4.7 billion gallons of gasoline for on-road transportation 40% of the California state annual total of 11.5 billion gallons.[17] Over 12.8 million gallons of gasoline daily were consumed by motor vehicles in the region in 1984, as shown in Table 10. About 61% was consumed in Los Angeles County; Orange and San Bernardino Counties had the next highest gasoline consumption levels, with shares of 18% and 8% respectively. Imperial County consumed the least amount of gasoline for on-road use in 1984 - only 1.1 percent of the regional total. The SCAG region also consumed diesel fuel for on-road transportation at a rate of 425,400 gallons per day in 1984, with over 45 percent consumed in Los Angeles County.[18]

While gasoline sales have risen steadily over nearly two decades, the rate of increase has not matched population growth for the same period, as shown in Figure 11. With per-capita travel on the rise, this is due to gradual improvements in average fuel economy. This is further illustrated by the bars at the bottom of the figure, which show that gasoline sales per 10,000 population have remained fairly constant in this decade, even showing a decrease since the late 1970s.

Passenger Rail Fuel Consumption. Passenger rail service was provided entirely by AMTRAK, which offers medium- to long-haul inter-city trips. This operation consumed about 7,400 gallons per day of diesel fuel in 1979. Commuter rail service between Oxnard and Los Angeles began in November 1982, and has since been suspended. Current operation uses over 9,000 gallons/day.

Transportation Energy Supply. Since 1973, supplies and costs for U.S. transportation fuels have fluctuated in response to events in the Middle East,

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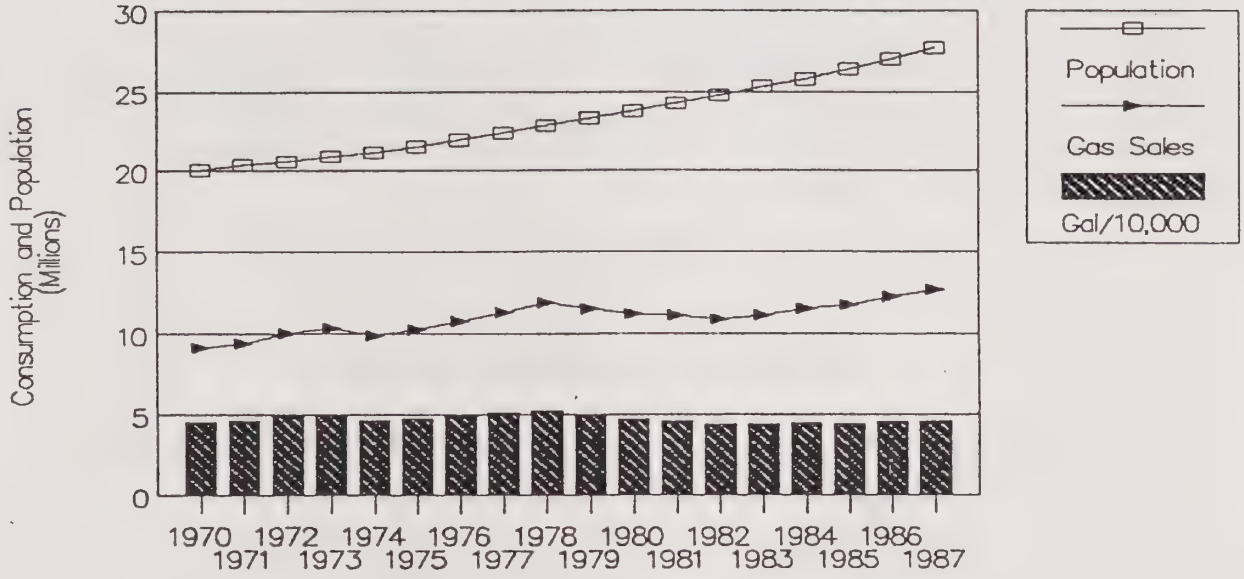
[17] California State Board of Equalization. Gross Taxable Gasoline Gallonage. News Release, August 31, 1988.

[18] SCAG. Regional Transportation Model. Direct Travel Impact Model (DTIM) Unpublished data, August 1988. Analysis of urban-area model results incorporated information on outlying areas from the state Air Resources Board: CARB. Burden Emission Model. Run date - July 13, 1988.

Gasoline Consumption
California 1970–1987



Planning Consultants Research

Source: CBE 1988

Figure 11
FUEL USE TRENDS

influencing consumption patterns. The drop in per-capita gasoline consumption in California that followed the massive price increases of the 1973-74 Arab oil embargo and the 1978-79 Iranian Revolution are illustrated in Figure 11. Each of these events was followed by reduced demand and some erosion in the real price of oil.

In December 1982, despite expectations that oil prices would continue to rise about three percent per year faster than inflation and with the Iran/Iraq war and cuts in Middle East oil production, the world oil market was in a state of oversupply and the price of gasoline decreased. Oil prices for 1981 through 1987, in 1987 dollars, are shown in Table 9. In 1986 and 1987, with a per-barrel price of only about $14 to $18, energy consumption was unusually high. Retail average prices of gasoline in the Los Angeles Area dropped from about $1.18 for regular unleaded self-serve in 1984 to a low of about $0.78 in 1986, as shown in Figure 12. In 1984 gasoline prices were more typical, and oil prices expected to increase steadily from now on. The California Energy Commission forecasts an increase from $18 per barrel in 1987, to $29 per barrel in 1992, and $41 per barrel by 2007 (in $1987).[19] These increased gasoline costs would be expected to influence transportation energy consumption patterns.

TABLE 9

RECENT AND PROJECTED OIL PRICES

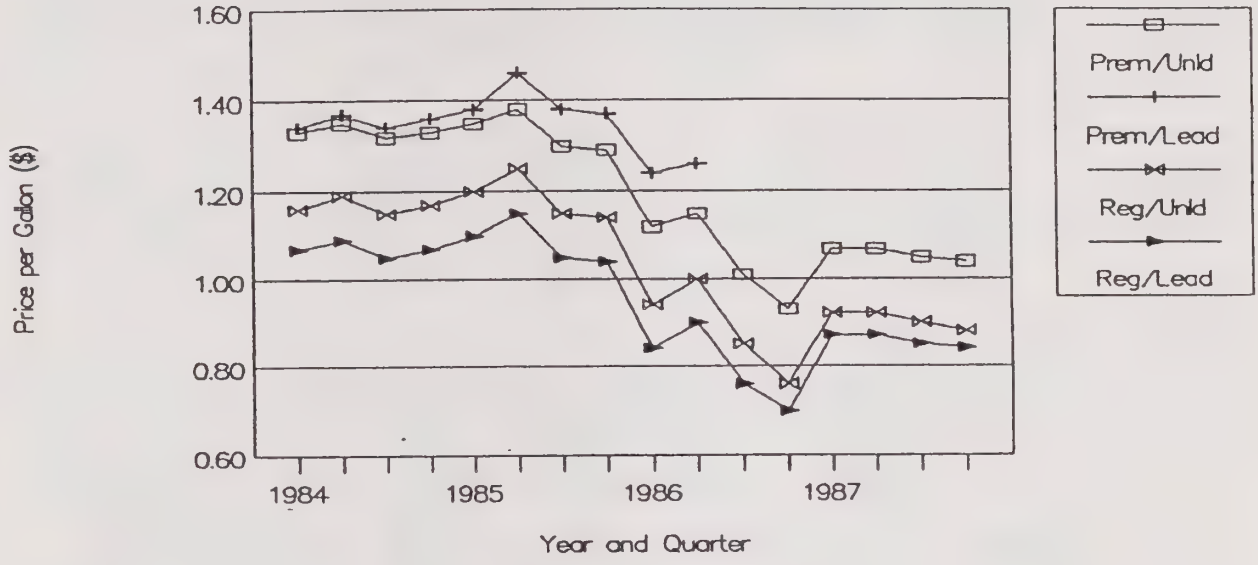
Year	Price per barrel [a]
1981	$46
1982	$39
1983	$34
1984	$31
1985	$28
1986	$14
1987	**$18**
1992	$29
1999	$34
2007	$41

(a) Prices US refineries pay for imported crude oil, $1987.

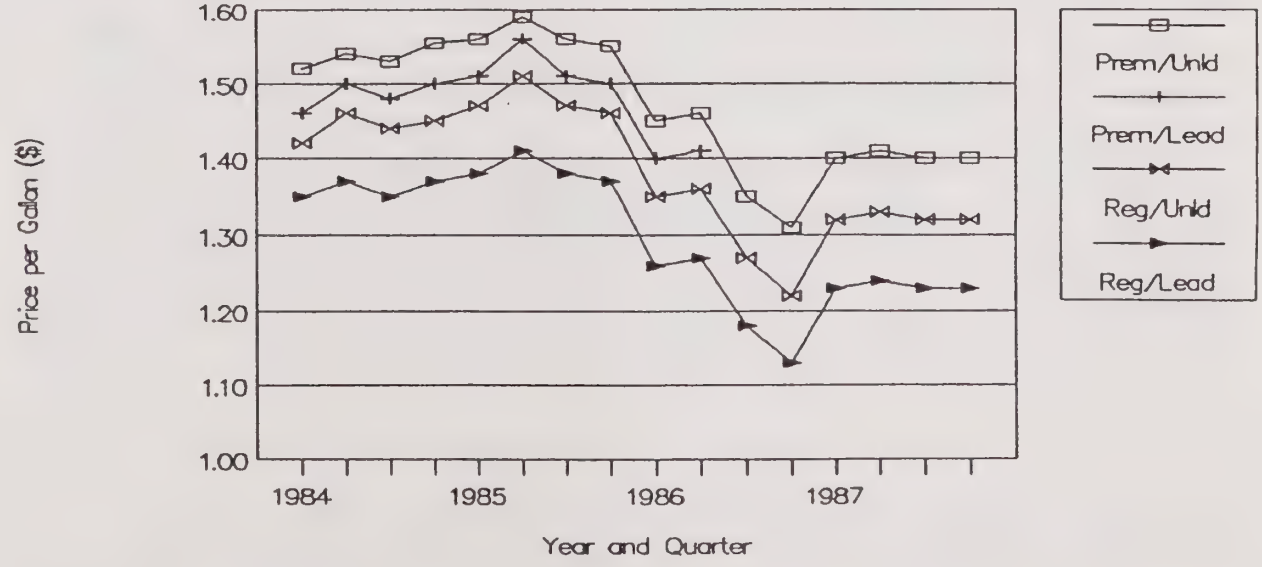
Source: California Energy Commission. December 1987.

[19] California Energy Commission. 1987 Fuels Report and Appendices. December 1987.

Gasoline – Retail Average Prices
Los Angeles Area, Self–Serve, Quarterly



Gasoline – Retail Average Prices
Los Angeles Area, Full–Serve, Quarterly



Planning Consultants Research

Source: Caltrans 1988

Figure 12
FUEL PRICE TRENDS

Table 10

ON-ROAD FUEL CONSUMPTION: SCAG REGION
(in 1,000 gallons/day)

Fuel	1984	2010 Without Plan	2010 [a] With Plan
Gasoline	12,844.9	22,995.5	13,916.2
Diesel	395.7	502.3	306.7

----- Sources of changes in consumption [b] -----
(% change)

Fuel	Regional Growth	Fuel Economy	Growth Mgmt	RMP W/O GM	RMP W / GM	2010 Plan vs 1984
Gasoline	79.0%	-21.2%	-21.6%	-22.8%	-39.5%	8.3%
Diesel	26.9%	-22.8%	-21.0%	-22.7%	-38.9%	-22.5%

(a) Note that 2010 gas consumption levels reflect California Energy Commission gasoline consumption rates, which are higher than those of DTIM and Burden (see citations).

(b) Combinations of sources of reductions result in less change than the sum of component measures due to the elimination of double-counting.

Sources: SCAG. DTIM Model Results. August 1988.
CARB. Burden Model Results. July 13, 1988.
CEC. Fuels Report. P300-87-016A, December 1987.

Petroleum (crude oil) is the primary source of all transportation fuels used in the SCAG region. The fuels are refined principally by large complexes located in South Bay area in the vicinity of the Ports of Los Angeles and Long Beach. The refineries supply fuels to the region and to adjoining markets in San Diego, southern Nevada, and much of Arizona.

Refineries in the region process over 1 million barrels of crude oil per day. Most of this supply is from domestic sources located in California and Alaska. The oil reserves in both states are expected to last through this century and beyond. Ample resources exist to sustain petroleum requirements of the state during the next two decades.[20]

However, California must be considered as an element of the world market relative to future prospects for petroleum fuels. The California Energy Commission has reviewed available evidence and concluded that proven oil reserves can sustain current world consumption rates for 22 to 25 years, and that total petroleum resources exist to continue consumption at this rate for another 35 to 140 years (reflecting uncertainty about total resources).[21]

Fuel Economy Trends. Since the automobile is the dominant form of transportation, its average fuel economy is a critical determinant of transportation energy consumption in the region. For new vehicles, it has increased during recent years, thus increasing the overall fleet average. One consequence of this trend is that total fuel consumption has declined slightly in recent years even as travel mileage has grown. The trend toward increased automobile fuel economy is expected to continue and is an important assumption in the RMP. Both the AQMP and RMP estimate that, aside from reductions due to GMP and RMP measures, there will be a 21 percent reduction in gasoline consumption and a 23 percent reduction in diesel fuel consumption in the region due to fuel economy alone. Several factors influence changes in fuel economy. These include: fuel costs, government policy, and fleet turnover.

Fuel Costs. Studies of automobile purchase patterns during previous periods of increasing fuel costs (1973-75 and 1978-80) have indicated that the overall fuel economy of purchased cars tends to offset changes of fuel prices. Although the recent abundant supply of oil on the world market and resulting stabilization of fuel prices has shifted auto buyer attention away from fuel economy as a primary purchase criterion, as indicated earlier, a long-term rise is anticipated in costs of motor fuel. Also, another disruption in world oil supplies could cause a sharp rise in oil prices and could result in an acceleration in the trend toward fuel economy.

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[20] CEC. Securing California's Energy Future. 1982.

[21] Proven reserves include only resources actually measured by drilling. Total resources include inferred deposits that are known to exist but are not yet proven or measured.

Fuel Economy Policies. The federal standard of 26 miles per gallon (mpg) for new automobiles was rolled back from 27.5 mpg in 1985 and is not currently scheduled for further increase. However, the state standards for air emissions control also contribute to greater fuel economy.

Fleet Turnover. As older cars wear out, they are replaced with cars designed to meet federal standards for fuel economy and federal and state standards for air emissions control. By the year 2010, this will have resulted in on-road vehicles being more fuel-efficient. For example, CEC and CARB forecasts indicate that by the year 2005, only an insignificant number of non-catalytic-converter equipped passenger vehicles will remain on the road in the region, due solely to fleet turnover.

Also, increasing vehicle fuel economy depends on reducing vehicle weight. Because trucks, buses and other large vehicles must be heavy to perform their functions, it is not expected that their fuel economies will increase substantially. If these vehicles use diesel or alternative fuels in the future, however, they would use a smaller share of total fuel due to higher fuel energy content.

PROJECT IMPACT

Although, relative to 1984, gasoline consumption would increase due to growth, as shown in Table 10, implementation of the RMP would result in significant energy savings over No Project (GMA-1 with only the currently funded transportation improvements) primarily in the area of on-road fuel use:

- Despite increases in travel, the amount of gasoline consumed in the region would only be about 8.34% greater in 2010 over 1984 consumption. Consumption of diesel fuel would actually decrease by an estimated 22.5% over the same time period.

- In comparison to the Baseline projection - 2010 with only existing and funded transportation facilities - new facilities, growth management, TDM, and TSM elements in the RMP would lead to decreases in both regional gasoline and diesel fuel consumption of about 39%.

These beneficial effects would be due to the RMP's ability to accommodate new traffic generated by growth in the region at speeds and service levels nearly equivalent to the current situation, thereby avoiding unnecessary fuel use associated with increased congestion. The level of transit facility use from home to work would also increase by nearly 13 percent, from 6.6 percent in 1984 to 19.4 percent in 2010. In addition, the increased energy efficiency of vehicles, due largely to fleet turnover, would in itself result in a 21% decrease in regional gasoline consumption over 2010 Baseline, and a 23% decrease in regional diesel fuel consumption.

On-Road Fuel Use. Without the RMP, year 2010 Baseline conditions would result in a 79% increase (10 million gallons per day) in gasoline consumption and a 27% increase (107,000 gallons per day) in diesel fuel consumption over 1984 regional levels, as detailed in Table 10. Under Baseline conditions, the greatest percentage increase in consumption would take place in Riverside County and other outlying counties.

In 1984, the average speed for all trips in the SCAG urban region was 46.6 mph, with a delay of 15.2 percent. By 2010, the Baseline projection indicates an average speed of 24.4 mph and a delay of 55.6 percent. The RMP on the other hand, would result in only a slight decrease in speed from 1984, at 45 mph with a delay of 18.3 percent. This is due to the fact that all of the measures in the RMP would work together to reduce VHT and VMT, thereby reducing vehicular fuel consumption. In addition, the AQMP assumes that by 2010 electric vehicles will represent 3 percent of cars, 12 percent of vans, and 2 percent of heavy duty vehicles in the South Coast Air Basin, further reducing the consumption of gasoline and diesel. With the RMP, the overall 39 percent reduction in regional gasoline and diesel fuel consumption over Baseline conditions would affect Riverside and Orange Counties the most (reductions of 55% and 50%, respectively).

Proposed growth management measures would result in a 21 percent reduction in regional gasoline consumption and 23 percent for diesel fuel. Assuming that job-housing balance policies would affect the location of 12% of added jobs and 6% of the new housing units, with a resulting VMT reduction of 32.5 million miles in the urbanized portion of the SCAG region. The effects of growth management on fuel consumption would be felt most strongly in Riverside and Orange Counties. Ventura County would experience a 1% increase in fuel consumption as a result of the growth management policies without the other RMP measures.

The RMP measures aside from growth management, would result in a 23% decrease in gasoline and diesel fuel consumption regionwide over GMA-1 (the Baseline projection). The greatest decrease would be experienced in Orange County (28%); the least in Ventura County (10%).

Construction Impacts. The impacts of facility construction on energy consumption can be estimated based on average fuel consumption figures for CalTrans highway construction projects in the Los Angeles area. The addition of approximately 1,600 lane-miles of new freeway facilities and widenings in the region through the year 2010 would consume a gasoline equivalent of 60,000 gallons per day for construction, and would result in an additional 4,000 gasoline equivalent gallons per day for road maintenance an increase of some 20% over current levels. A facilities-intensive strategy would result in figures at least five times as high.

Transit Energy Use. All rail projects in the 1988 RMP are assumed to be electrically operated. All required power would be generated locally,

with the assumption that utilities would continue to have access to the same types of fuels presently used. The electrical energy demand directly attributable to the 1984 RTP regional rail transit network was estimated to be 175 megawatt-hours per day. MetroRail operation is estimated to require 0.8 megawatt-hours per day by the year 2000 for the 19.7-mile line (50% for propulsion, 42% for operation of its 17 stations and 8% for maintenance); Los Angeles - Long Beach Light Rail, however, is estimated to consume 100 megawatt-hours per day by the year 2000 for its 25 mile line operating at 6-minute headways; comparable consumption is expected of the Century Freeway Light Rail line. RMP and AQMP strategies for 100% electrification of line-haul rail routes would require 3 gigawatt-hours per day (seventeen times that of the previous RTP); peak operation would require about 540 megawatt capacity. The specific demand of rail transit would represent about 1% of regional power plant supply by 2010.

RECOMMENDED MITIGATION

The RMP reduces fuel consumption over the 2010 No Project alternative. However, pursuant to CEQA, impacts of the plan are assessed relative to existing conditions; the plan serves to accommodate growth, minimizing yet allowing increases in fuel consumption. Since the 1988 RMP increases on-road fuel consumption, the following measures which are planned for implementation through the 1988 Draft South Coast Air Quality Management Plan are recommended as mitigation for the increase in gasoline consumption of the RMP:

Alternative Fuels. The AQMP calls for the following penetration rates for alternative fuels and electrification:

- Passenger vehicles: 40% to use electricity or methanol by 1998, and 100% electrification by Tier-3 implementation.
- Heavy-duty vehicles: 70% to use methanol by 1998, and 100% to use methanol by Tier-3 implementation.
- Fleet vehicles: 20% electrification by the year 2000, and 80% to use methanol by the year 2000.
- Transit buses: 30% electrification by the year 2007, and 70% to use methanol by the year 2007.

The AQMP full vehicle electrification strategy would consume a total of 271 gigawatt-hours of electrical energy per day by 2010; peak operation would require a 33,000 megawatt power capacity.

Potential Methanol Health Effects. The methanol requirements of the alternative fuels program would create a demand the fuel at levels twice as high as forecast in this section for year 2010 gasoline consumption, since

two gallons of methanol are required for the same amount of energy output of one gallon of gasoline. Although methanol is a cleaner-burning fuel than gasoline, diesel or fuel oil with regard to the criteria pollutants, hazardous air pollutant emissions from methanol are still under study. Initial assessments indicate that gasoline, because of its aromatic content (benzene, toluene, xylenes, etc.) may potentially be more hazardous than methanol.[22,23]

Potential impacts exist from the implementation of a large scale program to replace fossil fuel powered vehicles with methanol fueled vehicles. Methanol, produced from natural gas, is a neurotoxin, and combustion of methanol in vehicles can produce formaldehyde. Formaldehyde can irritate the nose and throat and is a probable human carcinogen (listed as EPA category B);[24,25] it is currently under review in the state Tanner process for listing as a toxic air contaminant. The SCAQMD will reevaluate its endorsement of the methanol component of the alternative fuels program upon completion of health effects studies currently in progress.

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[22] Kaufman. Toxic Air Pollutants. 1984.

[23] Cornish, HH. "Solvents and Vapors", in Cassarett and Doull's Toxicology: The Basic Science of Poisons. Macmillan, 1980.

[24] US EPA. Guidelines for Carcinogen Risk Assessment. Federal Register 51:185 pp 3392-34067, September 24, 1986.

[25] US EPA. The Air Toxics Problem in the United States: An Analysis of Cancer Risks for Selected Pollutants. May 1985.

4.D. GEOLOGY AND SEISMICITY

REGIONAL SETTING

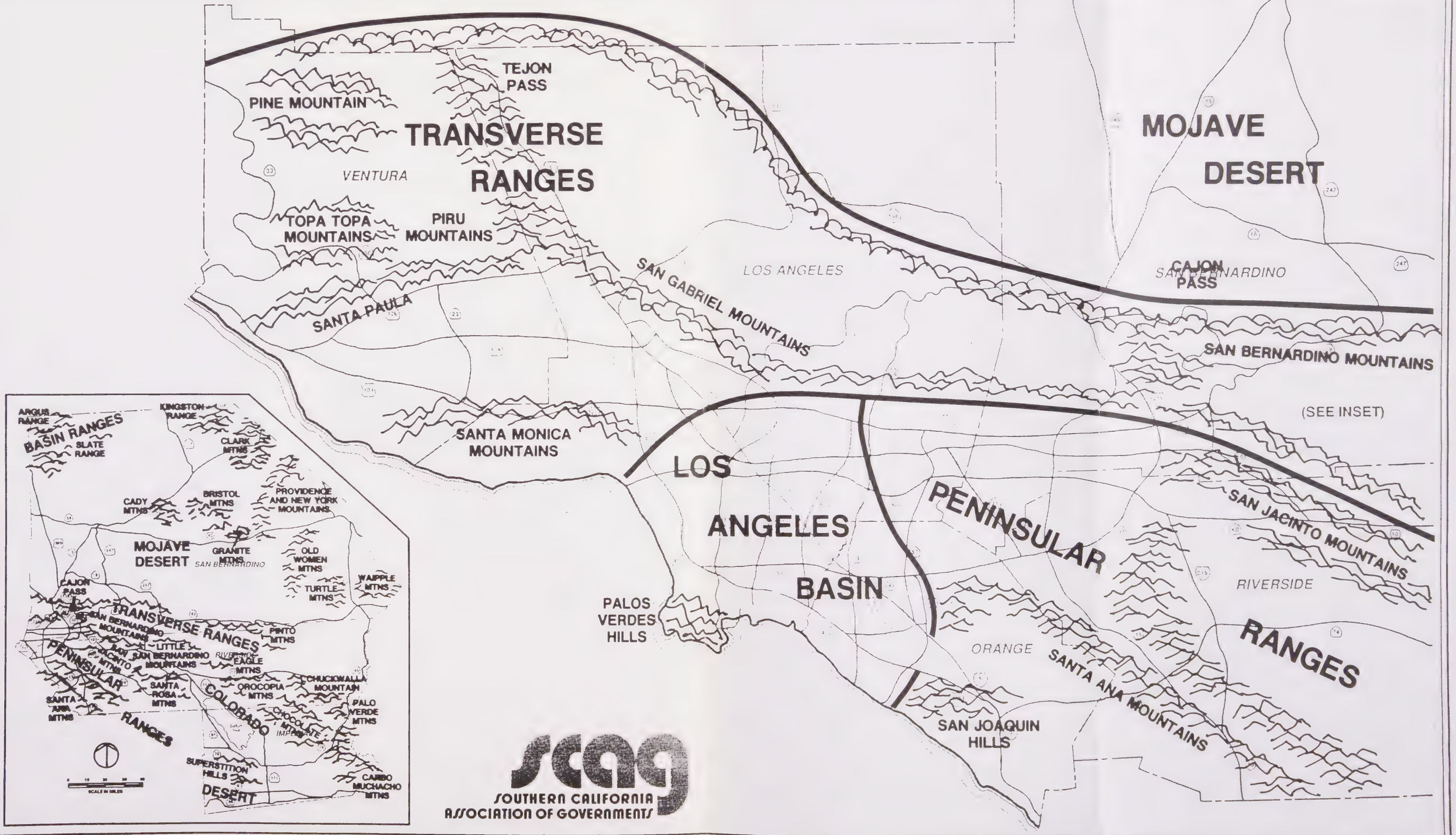
Provinces. The region extends over five geomorphic provinces, each with characteristic topography and rock types. These provinces include the Transverse Ranges, Colorado Desert, Mojave Desert, Peninsular Ranges and the Los Angeles Basin, as shown in Figure 13 and discussed below. In general, the region is characterized by high coastal mountains and foothills, with interspersed alluvial plains or basins; to the east, low mountain ranges punctuate desert valleys. Rock types in the region range from ancient, crystalline basement rocks; old, chiefly marine, sedimentary rocks; and recent continental (alluvial) deposits.

The Transverse Ranges comprise mountains and valleys having a dominant east-west trend striking directly across the northwest-trending Coast Ranges. The ranges include the Santa Ynez, Topatopa (6210 feet), and Pine Mountain - Frazier Mountains ranges (8013 feet) in Ventura County; the Santa Susana (2511 feet), Santa Monica (2163 feet), and San Gabriel Mountains (6161 feet) in Los Angeles County; and the San Bernardino Mountains (8537 feet) in San Bernardino County. The east-west structural trend of the Transverse Ranges is broken by folded structures oblique to that trend and by major faults, including the San Gabriel and San Andreas faults. The Transverse Ranges, including Tejon Pass (4144 feet), Cajon Pass (4226 feet), Ortega Highway pass (3048 feet), Soledad Pass (3179 feet), border the lowland areas of the Oxnard Plain, Ojai Valley, Santa Clara Valley, Simi Valley, San Fernando Valley, Los Angeles Basin, San Gabriel Valley, and San Bernardino Valley.

The Peninsular Ranges have a northwest trend and are geologically similar to the Sierra Nevada province. The portion of the Peninsula ranges in the region includes the Santa Ana Mountains in Orange and Riverside counties, the San Jacinto and Santa Rosa Mountains in Riverside County, and other smaller ranges and hills. The northwest trend of the Peninsular Ranges is caused primarily by faulting, particularly along the San Jacinto and Elsinore faults. Portions of the Colorado Desert, Mojave Desert, and Basin Ranges provinces make up the extensive desert portions of the SCAG region.

Various environmental problems, such as erosion, landslides, subsidence, liquefaction, and earthquakes are associated with the geology and soils of the SCAG region. These problems are important with respect to transportation, because they may pose hazards that can affect operation of facilities or they may be constraints to aspects of transportation system development.

Landslides and Erodability. Soil stability problems in the SCAG region include erosion, landslides, subsidence. Erodible soils are found in the following areas: San Bernardino Mountains, San Gabriel Mountains, Santa Monica mountains, eastern Santa Ana Mountains, and Jurupa Mountains; Santa Susana Mountains, San Gabriel Mountains and San Jose, Elysian, Repetto, and San Joaquin Hills; and along coastal areas and the Santa Clara, San Gabriel,



SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Planning Consultants Research

0 10 20
SCALE IN MILES

Source: SCAG & DMJM, 1978.

Figure 13
GEOMORPHIC PROVINCES

VENTURA

LOS ANGELES

SAN BERNARDINO

RIVERSIDE

ORANGE

(SEE INSET)

SAN BERNARDINO

RIVERSIDE

IMPERIAL

SCALE IN MILES

SCAG
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

Planning
Consultants
Research

0 10 20
SCALE IN MILES

LEGEND:

- HIGH LANDSLIDE POTENTIAL
- SUBSIDENCE AREAS
- ALQUIST-PRIOLO SEISMIC STUDY ZONES
- HIGH LIQUEFACTION RISK
  (LSI = 90, 90% PROBABILITY OF NONEXCEEDANCE IN 50 YEARS, OR AVERAGE RETURN PERIOD OF 500 YEARS)

Sources: SCAG & DMJM, 1978.
California Mines & Geology, 1985.
Youd & Perkins, 1987.

Figure 14
GEOLOGIC HAZARDS

and Los Angeles Rivers. Off-road vehicles contribute to the denudation of hillsides and local sedimentation problems in the desert areas. Soils in the mountains and desert are highly erodible.

Landslides can occur in fine-grained material, where bedding planes are cut, or where rock materials fail under loading or weathering. Locations where major slides have occurred include: the Santa Monica Mountains, particularly Pacific Palisades and northern slopes; the Crystal Lake area of the San Gabriel Mountains, San Dimas Canyon, Palos Verdes (Portuguese Bend and Point Fermin), the Puente Hills, the San Juan Capistrano area, the San Jose Hills, the Upper Santa Clara River area; the Castaic area; the Santa Ynez Mountains; and the Topatopa Mountains.

Subsidence. Occurring chiefly in areas of extensive pumping of oil or water and in marsh or bog areas, subsidence can result in sudden or gradual ground failure and damage to or collapse of structures. Known subsidence areas include the Los Angeles harbor area due to oil production the Santa Ana and La Verne areas from water pumping and the Beverly Hills area from unknown causes. Major subsidence risk areas are shown in Figure 14.

Earthquakes and Seismic Risk. Southern California is well known to be a seismically active area. The major faults intersecting the region are shown as Alquist-Priolo Seismic Study Zones in Figure 14; these fault zones have been identified through special studies, and are zoned by the state to exclude projects within 50 feet of fault traces.[26,27] Major active fault systems in the SCAG region include the San Andreas, Cucamonga, Newport-Inglewood, San Jacinto, San Gabriel, and Imperial.[28] Movement also occurs along numerous smaller faults. At least 50 earthquakes of Richter Scale magnitude 6.0 or more have occurred in Southern California since 1769. The most intense ground shaking since the 1971 San Fernando earthquake (magnitude 6.4) was centered in Imperial County: an earthquake measuring 6.6 on the Richter Scale occurred on October 15, 1979 and another measuring 5.6 occurred on April 4, 1981. An earthquake measuring 5.9 on the Richter scale occurred at Whittier Narrows on October 1, 1987.[29]

The greatest amount of damage from earthquakes results from ground

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[26] State of California. Fault-Rupture Hazard Zones in California. Department of Conservation, Division of Mines and Geology - Revised 1985.

[27] State of California. Alquist-Priolo Special Studies Zones Act. Public Resources Code, Division 2, Chapter 7.5 - Effective March 1973.

[28] Active faults means that their geology indicates that they have ruptured the ground surface within Holocene time - the last 11,000 years.

[29] The Whittier Narrows Fault was classified as inactive, as it had not appeared to have ruptured the ground surface within the Quaternary period (the last 2,000,000 years).

shaking. Although ground shaking attenuates over distance, with the large number of known and suspected active faults in Southern California, any point within the region could be exposed to hard shaking. Other seismically related hazards include soil liquefaction and landslides; ground displacement (or surface fault rupture) from faulting; and tsunamis. While tsunamis are considered to be a relatively minor hazard in Southern California, liquefaction, landslides, and ground rupture along faults are possible.[30]

Liquefaction. Liquefaction occurs as a result of earth shaking in areas with very fine-grained, low-density deposits that are saturated with water, usually due to a high ground water table; coastal areas, such as the ports of Long Beach/Los Angeles and Port Hueneme, and other low marshy areas could experience liquefaction due to ground shaking. Recent development of a liquefaction severity index (LSI) defines hazards on a scale of 0-100.[31] An LSI of 90 is characterized by very abundant ground effects including numerous sand boils with large aprons, 30% or more of some areas covered with freshly deposited sand, many long fissures with multiple strands parallel streams and shore lines with openings as wide as two or more yards; some intact masses of ground between fissures can be displaced two meters down gentle slopes, and ground settlements of more than a foot are common. Figure 14 indicates areas in the region with a 90% probability experiencing liquefaction of LSI 90 levels in 50 years (or an average return rate of 500 years).

Landslides can occur as a result of seismic activity in hilly or mountainous areas. Fault displacement can occur suddenly, at the time of an earthquake, or slowly, as fault creep causes gradual ground distortion and movement along a fault trace not accompanied by significant earth shaking. This can occur wherever active faults exist in the region.[32]

Transportation Facilities Risks. Recent studies have shown that a catastrophic earthquake having a magnitude of 8.3 on the Richter scale is likely to occur on the south-central San Andreas fault in Southern California before the year 2000. The California Division of Mines and Geology has developed an earthquake planning scenario assuming the occurrence of a magnitude 8.3 earthquake on the San Andreas fault based on the great Fort Tejon earthquake of January 9, 1857, and developed a seismic intensity distribution to show the location of damage that would result from the scenario earthquake. The scenario portrays anticipated damage to the highway, airport, railway, marine, communication, water, waste disposal, electrical power, natural gas, and petroleum lifelines would experience significant

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[30] NOAA, 1973:44-45. The tsunami resulting from the Alaskan earthquake of March 1969 caused some damage in the Los Angeles Harbor.

[31] Youd, TL and DM Perkins. "Mapping of Liquefaction Severity Index", Journal of Geotechnical Engineering. November 1987.

[32] California Division of Mines and Geology. "Earthquake History of California", in California Geology. February 1986.

damage. The study also shows that damage would not be uniform, but would be related to the design of specific structures, the geologic ground conditions on which they are built, and their distance from the fault. The predicted types of damage that would affect the region's transportation systems under the above-referenced scenario include:[33]

- o The highway network would experience major structural failures (such as the collapse of overpasses, rockfalls, or fault rupture), resulting in the closure for extended periods of time of interstates in the northern portion of Los Angeles County, and there would be lesser, more widespread damage that could be more rapidly repaired resulting from the failure of minor settlement of bridge approaches and other fills, slides on cut slopes, and rockfalls;

- o The most extensive damage to railroads would occur in locations directly affected by surface fault rupture, landslides and rockfalls in mountainous terrain, and in areas with unstable soil where the roadbed can buckle due to ground movement - railway bridges would generally not suffer serious damage except in areas subject to ground failure or to surface fault rupture and railroad tunnels would experience severe damage in areas affected by permanent ground movements due to landslides or surface fault rupture, but they would be unlikely to suffer internal damage from ground shaking;

- o Damage to ports in the Los Angeles-Long Beach and Port Hueneme areas would be minor, although ground failure due to liquefaction and differential settlement could occur, with resulting serious damage to quay walls, and shaking could damage structures throughout the harbor areas.

The California Department of Transportation (Caltrans) develops engineering design specification for highway projects to account for site-level geologic and seismic conditions; the designs are reviewed by the Federal Highway Administration (FHWA). Design of transit projects is handled in a similar way, with the funding agency - Urban Mass Transportation Administration (UMTA) and Caltrans - reviewing project design. Many of the current seismic design criteria being used in the region were developed following the 1971 San Fernando earthquake, which damaged highway bridges (including the collapse of an overpass), closed roads in mountainous areas due to landslides, fill settlements, and fault breaks, and bent railroad rails and damaged fills in the area of a landslide.

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[33] California Division of Mines and Geology. Earthquake Planning Scenario for a R8.3 Earthquake on the San Andreas Fault in Southern California. Special Publication 60, 1982.

PROJECT IMPACT

The emphasis of the RMP on Demand Management and Growth Management would minimize the construction of new facilities. New facilities and highway widenings under the RMP have been reduced relative to previous Regional Transportation Plans. Under the RMP, 160 additional highway and 23new rail corridors intersect earthquake faults compared to 330 and 17 respectively for a more facilities-intensive strategy.

Nevertheless, geologic conditions in the SCAG region will both affect and be affected by transportation projects set forth in the RMP. The extent of these impacts will be determined by underlying conditions at project sites, the nature and scope of the improvements, and the extent to which mitigation measures are carried out in project construction. The impacts of the RMP projects would be potentially significant on a regional level when they would result in opening up access to new areas with major geologic hazards, or when the combined effects of a number of projects result in placing people and structures at risk. The effects of the proposed new transportation facilities should also be viewed in the context of existing and anticipated levels of urban development in the region. Potential for significant increases in erosion, earth movement, and damage from seismic ground shaking can result if project design criteria do not include appropriate engineering measures.

Generally, construction of highway facilities and transit guideways in new rights-of-ways or previously undeveloped areas will have greater potential adverse effects than projects that require only modification of existing alignments or that utilize existing transportation rights-of-way.

Soil stability problems will affect almost all of the projects in the RMP to some degree, as construction-phase erosion will occur with any kind of earthwork, particularly if undertaken during the winter rainy season or if rains occur before landscaping becomes established. The RMP highway widening and upgrading projects, and transit projects requiring relatively small amounts of construction and utilizing existing rights-of-way, would probably cause only minor erosion due to their location in previously developed areas and the limited nature of project construction. Erosion could, however, be potentially significant for large-scale projects, such as the San Joaquin, Eastern, and Foothill corridors in Orange County, that involve major new roadway construction in lightly developed or undeveloped steep terrain with a potential for soil stability problems. Erosion would also result from construction of roadways in desert areas, such as SR-86 in Riverside and Imperial Counties, where wind erosion would carry sand and soil from disturbed areas.

Roadway and transit projects crossing hilly or mountainous areas would be vulnerable to damage and disruption caused by potential slope failures - landslides, mudslides, and rockfalls; in some cases, these events could be caused by project construction, if inadequate design or engineering results in the undercutting of hillsides. Projects in areas that could be affected by slope instability include the San Joaquin Hills Corridor, the Eastern and

Foothill corridors (Orange County), and SR-71 (San Bernardino County). The Wilshire Metro Rail, while it is a major transit project crossing the Santa Monica Mountains through Cahuenga Pass, is proposed as a subway, and it would not be vulnerable to these types of slope failures; specific engineering design of the tunnel would be needed to account for potential geologic instability. Erosion and slope instability could occur on any of the construction projects in the RMP that involve artificial embankments.

Subsidence, or soil settlement, is a potential problem in the area of the Ports of Long Beach and Los Angeles, where oil drilling activity in the Wilmington Field has caused subsidence by about 30 feet as shown in Figure 14.[34] Although the rate of this settlement has been stabilized, subsidence would have to be accounted for in project engineering and environmental studies for some transportation improvements that are proposed to serve the ports.

Because Southern California is a seismically active area, all of the new transportation projects proposed in the RMP could be exposed to seismic ground shaking from the major regional faults that traverse the region, and locally, from smaller active faults. The magnitude of ground shaking could range from minor to potentially very destructive. The greatest impacts of earthquakes could be ground shaking damage to facilities with substandard construction, facilities with elevated structures, and fault rupture zones. However, it is expected that, with new engineering design criteria for earthquake-resistant structures, impacts from seismic activity on the RMP projects would be less than on older, existing facilities.

Projects that are close to major regional or local faults, or that involve elevated structures or subways, would be particularly vulnerable to seismic ground shaking and would be the most likely to sustain substantial damage if design measures do not accommodate potential ground acceleration. Examples of RMP projects that are located near active faults include: the Norco Reach (I-15) freeway extension in Riverside County, which is close to three major regional faults - the Chino, San Jacinto, and Elsinore - plus a number of secondary faults; the San Joaquin Hills Corridor in Orange County, which is in a zone of major regional faults, although the local faults are considered inactive; the SR-101 widening project in Ventura County, located near the active local Oak Ridge fault; and the SR-71 upgrade and widening projects in San Bernardino County, located near the Chino fault and other regional faults. Damage to these and other RMP projects from ground shaking would depend upon the magnitude of the earthquake and the location of the epicenter. Several projects have been studied with options for elevated structures, which would require special seismic design considerations. These projects include: the Harbor Transitway (SR-110) guideway; the Century Freeway Light Rail Transit (I-105); and double-decking the Ventura Freeway (US-101) from Topanga Canyon (SR-27) to the Harbor Freeway (SR-110) and the Santa Ana Freeway (I-5) from I-110 to the Orange County line. The proposed

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[34] Norris, RM and RW Webb. Geology of California. John Wiley, 1976.

Wilshire Metro Rail Subway would also require special design features to accommodate potential ground shaking, noted as mitigation below.

Potential for ground rupture damaging any of the proposed transportation facilities is limited to those few that cross active fault zones. These include the Century Freeway (I-105) in Los Angeles County, which crosses the Newport-Inglewood Fault; and the Foothill Corridor in Orange County, located in the area of the Foothill Fault. Soil liquefaction from ground shaking is possible in areas noted on Figure 14, especially along the coast or where the water table is shallow. The Century Freeway (I-105) highway and transit projects, the Norco Reach (I-15) highway extension in Riverside County and Route 1 widening in Ventura County, travel through coastal or other areas where there is a potential for liquefaction.

Seismic activity could trigger slope failure in hilly and mountainous areas described above as having this potential. Tsunamis could affect projects located in coastal areas, such as SR-55 from SR-91 to I-405 in Orange County and SR-1 in Ventura County (Port Area), where the damage from seismic sea waves could occur in areas that are lower than 20 feet.

RECOMMENDED MITIGATION

Mitigation measures would need to be developed for individual projects and incorporated in project design. In general, measures that would minimize or avoid potential geotechnical hazards or constraints associated with projects proposed in the Regional Mobility Plan include the following (adapted from OCEMA, 1979; OCEMA, 1981; FHWA/Caltrans, 1983b; and SCRTD, 1983).

Erosion and Slope Stability

1. Provide adequate slope drainage and appropriate landscaping to minimize the occurrence of stability problems such as erosion and mudflows, and provide slope erosion protection from stream runoff, particularly in major canyons.

2. Avoid landslide areas and potentially unstable slopes wherever feasible, by project realignment or redesign of cut and fill procedures on affected slopes.

3. Perform corrective grading or other remedial measures (removal of unsuitable materials, buttressing, lowering or flattening slopes, etc.) to assure adequate slope and roadway stability.

4. Require adequate geotechnical investigation of proposed grading prior to construction, and inspections during grading to verify anticipated conditions.

Soil Settlement

5. Eliminate potential settlement by removal of or allowing for compressible soils beneath proposed fills.

Seismic Hazards

6. Design in accordance with county and city code requirements for seismic ground shaking, with special attention to the seismic design of bridges and elevated structures. According to the California Department of Transportation (Caltrans), the seismic design force criteria used for bridges and other structures should be approximately 2.5 times greater than that used prior to the San Fernando earthquake of 1971.

7. Factors used in the seismic design of projects should consider: seismicity of the site, soil response at the site, and dynamic characteristics of the structure. Features used in design should include: the use of hinge restrainers to hold together superstructure elements during extreme motions, the use of heavy keys to limit movement between the superstructures and abatements, and the use of increased column tie reinforcement in regions of maximum flexure to permit dynamic excursions into the inelastic range without failure.

8. Avoid alignments which entail extensive cuts in faulted hillside areas where weakened structural conditions may be exposed.

9. Investigate the potential for liquefaction and settlement along potential alignments and identify appropriate corrective measures (i.e., overexcavation and recompaction, structural reinforcement) for areas where these constraints are encountered.

4.E. BIOLOGICAL RESOURCES

REGIONAL SETTING

As Southern California comprises a varied medium for the sustenance of life, this discussion of biological resources within the SCAG region gives separate treatment to the following resources:

- vegetation;
- animal life;
- rare and endangered species; and
- areas of ecological significance.

The SCAG region is home to a rich variety of biotic communities. The rich and abundant flora and fauna of Southern California can be attributed to:

- the opportunity to receive species from both the drier desert and the wetter Sierra regions;
- a mild climate; and
- local evolution due to topographic diversity.

Urban development and the accompanying development of the transportation system have disturbed, limited and wiped out many plant and animal communities in the region. Highways and other facility construction have taken up habitats of plants and animals. Indirectly, urbanization and the corresponding growth of air and water pollution have greatly impacted biotic communities. As a result, the diverse animal and plant communities of the region have been pushed into the isolated, localized open spaces that remain.

The greater SCAG region can be divided into five ecological subregions, corresponding to the Geomorphic Provinces in Figure 13:

- North and Northwestern Mountain Range;
- East Central Mountain Range;
- Santa Monica Mountains;
- Los Angeles Basin; and
- Colorado and Mojave Deserts.

The ecologic characteristics of the four major subregions have determined the biotic communities that developed in each. They have also affected their subsequent ability to adjust to human encroachment. Of the four subregions, the Los Angeles Basin has undoubtedly seen the most development. Most of the ecologically significant areas there are in isolated pockets. The North and Northwestern Mountain Range and the Santa Monica Mountains experience low development pressures. The East Central Mountain Ranges subregion is now increasingly being used for recreational purposes.

The following sections detail the vegetation, animal life, rare and

endangered species, and areas of ecological significance in the subregions.

Vegetation. The original vegetation of Southern California has undergone major modifications since the beginning of the 19th century. Disturbance began with livestock grazing, continued with the establishment of agriculture, and intensified with urbanization of the coastal zone and low-lying interior valleys. This disturbance and development has transformed the original vegetation pattern to one of scattered patches of native communities in the urban and agricultural regions. Disturbance is spreading along selected foothills and in the lower elevations of most of the mountains in the western portion of the region, and has even reached some higher areas, as in the San Bernardino Mountains.

The major groups of remaining plant communities and their locations in the region are shown in Figure 15. These include conifer, hardwood, chaparral, desert, herbaceous, and non-vegetative units.

Conifers exist primarily at higher elevations where the climate is colder and more moist. The hardwood units occur widely through the foothill and low mountain areas of the non-desert portion of the SCAG region. The chaparral units are the dominant vegetation throughout the lower elevations of the non-desert portion of the region. The desert units, occurring in arid areas of relatively low elevation, cover the bulk of the land area in the rural portion of the SCAG region, and encompass major portions of San Bernardino County, eastern Riverside County, and Imperial County. The herbaceous units occur in isolated areas of the non-desert portion of the region and over a large area of San Bernardino County. The non-vegetative units appear in urbanized and agricultural areas where most native vegetation has been removed and replaced with agricultural crops, ornamental plants and human structures.

Animal Life. Agricultural development and the increasingly urban nature of Southern California has changed and, in some cases, eliminated many of the natural habitats of animal species which once dwelt in the region. Affected animals have been reduced in abundance, migrated to other areas, or as in the case of the grizzly bear, California condor, and mountain lion, have become completely or nearly extinct from the region. Despite these changes, there are still viable animal communities that exist in the coastal areas, foothill and mountain areas, and the desert.

The major faunal areas of the SCAG region are the coastal lowland and shore areas, interior valleys and plains, foothills and mountain areas, and desert and desert mountain areas. The coastal lowland and shore areas are among the most intensively developed areas in the region. Highly productive coastal wetlands are the most significant remaining animal habitats, containing a unique plant community, the coastal salt marsh community. The wetlands shelter many indigenous species of plants and animals, including resident and migratory birds. Development, dredging, and sedimentation have significantly reduced the number of wetlands over the years. Their further

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SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

Planning
Consultants
Research

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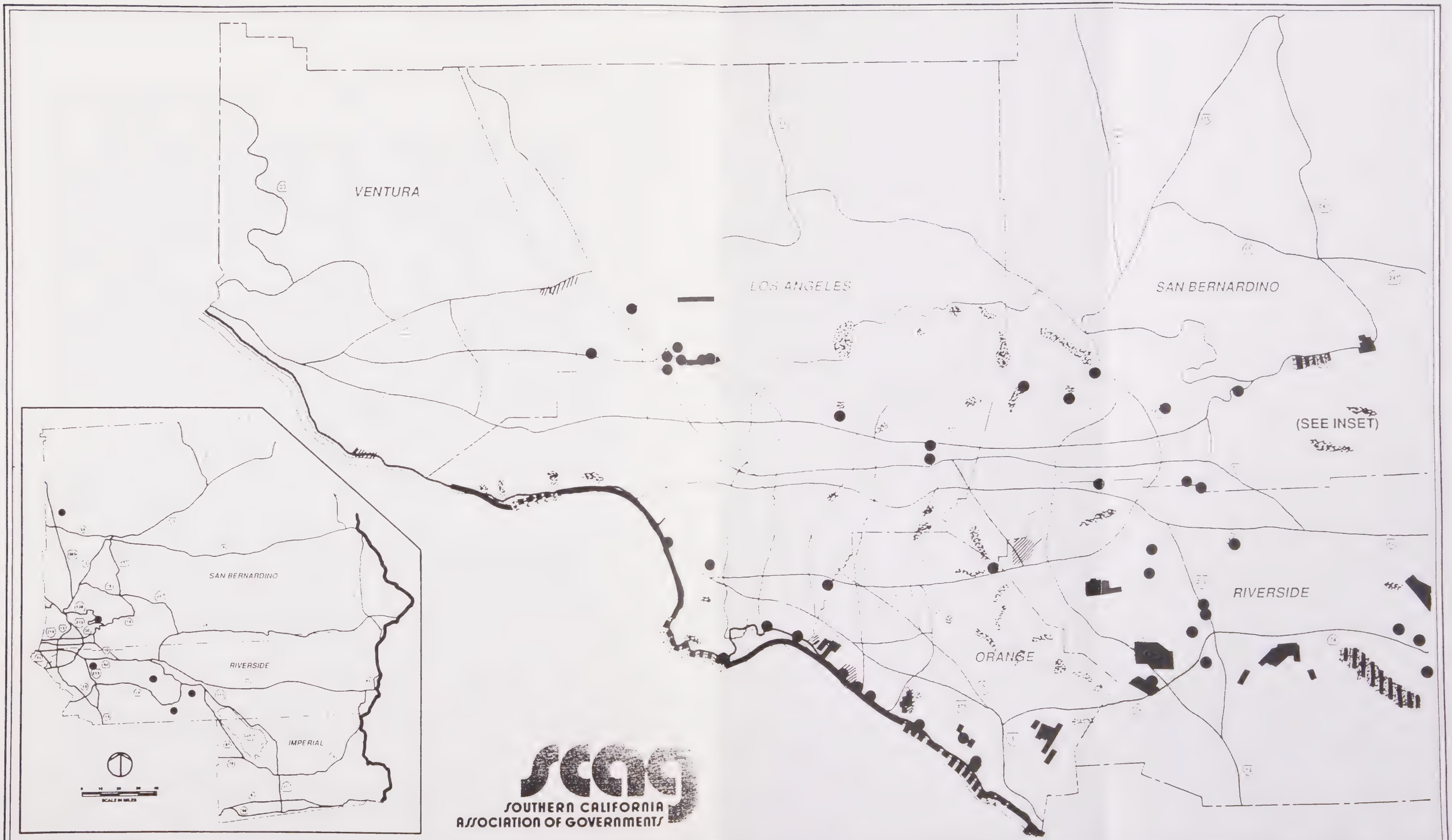
SCALE IN MILES

LEGEND:

- CONIFER
- CHAPARRAL
- HARDWOOD
- URBAN/AGRICULTURAL
- HERBACEOUS
- DESERT

*Source: USFS. **CALVEG: Mosaic of** California Vegetation. 1979*

Figure 15
VEGATATIVE PROVINCES



Planning Consultants Research

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SCALE IN MILES

LEGEND:
- RARE AND ENDANGERED ANIMALS AND PLANTS
- UNIQUE ECOLOGICAL COMMUNITIES
- WETLANDS

Sources: County General Plans:
Los Angeles, 1975; Ventura, 1988.
California Department of Fish & Game, 1988.
SCAG & DMJM, 1978.

Figure 16
UNIQUE ECOLOGICAL COMMUNITIES

loss would have a severe impact on migrating bird life, indigenous fishes and several endangered species that are dependent on this coastal habitat.

The interior valleys and plains, such as the Santa Clara River Valley, Los Angeles Basin, San Fernando Valley, Pomona-Walnut Valley, and western Riverside County, have suffered great losses to their animal communities from urbanization. Some larger animal species have disappeared. The remaining species, both native and introduced, are well adapted to human development. Lakes and reservoirs interspersed throughout these areas from important resting places for migratory birds. Protection of these areas is probably the most significant measure that can be taken for the preservation of interior valley wildlife.

The foothills and mountain areas have diverse animal communities that include black bears, mountain lions, coyote, bighorn sheep, deer, raccoons, opossums, skunks, rabbits, and a large variety of bird species including such raptors as the bald eagle, the golden eagle, and the California condor. The fauna of these areas would be sensitive to disturbance and isolation caused by transportation projects and increased recreational use and development. Habitats for endangered mountain species such as the California condor in Ventura County and the peninsular bighorn sheep in Riverside County are very sensitive to human disturbance.

The desert and desert mountain areas are home to a wide variety of animal life, including many species of birds, mammals, and reptiles. Prominent species include the Nelson bighorn sheep, mule deer, the desert tortoise, and the turkey vulture. Various rare and endangered animals also exist in the desert area. Desert habitats are often highly vulnerable to human activity and slow to recover when damaged.

Rare or Endangered Species. Human activity has resulted in the elimination of many animal and plant species from parts or all of the region, and has reduced some species to rare or endangered status. State and federal legislation has extended protection to species of wildlife judged as rare or threatened with extinction. Rare and endangered plant and animal species (state and federal listings) and their general locations are presented in Figure 16. The species feature low population numbers and limited distributions, and are therefore especially sensitive to human activity.

Areas of Ecological Significance. The SCAG region contains about 170 ecologically significant and/or sensitive areas.[35] Most of these areas were identified in a comprehensive survey undertaken by the California Natural Areas Coordinating Council in the early 1970s, and are representative of endemic California plant communities or are significant as important animal habitat areas. SCAG published an even more comprehensive listing of 500 areas

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[35] SCAG. Environmental Setting: SCAG Region. Prepared by DMJM as a basis for Growth Forecast Policy, 208 Areawide Waste Treatment Management Plan and Air Quality Management Plan Development, October 1978.

of regional significance and concern as part of its Conservation and Open Space Plan.

PROJECT IMPACT

Impacts to biological resources from the proposed project will come from the facility construction plan element. However, unlike previous RTPs for the SCAG region, the proposed plan attempts to minimize facility development through TDM, TSM, and Job/Housing Balance. Additionally, SCAG envisions most of the proposed projects to take place in already urbanized or rapidly urbanizing locations in the region. But some of the remaining projects are bound to have impacts on remaining terrestrial biological resources.

Impacts to biological resources will come from the construction of structures and their operation and existence. Negative impacts will invariably accompany the construction of transportation structures. Construction can result in the removal of physical habitats because of cut, fill and other grading activities. There is direct loss to vegetation, destruction of less mobile wildlife forms, and erosion and siltation hazards. Loss of nutrients from soil and water runoff pollution, potentially resulting in adverse effects on plant and animal communities, are also indirectly related to construction.

Then there are the negative impacts which might be thought of as operation related impacts. Large transportation structures such as elevated roadways and bridges can cause shading and alteration of wind patterns which result in changes to plant and animal communities. Riparian vegetation may also be lost as the result of shading from bridges built over drainage. The additional traffic generated by transportation improvements can cause added disturbance by noise and vibration. The growth in recreational and development activities that follows increased human access to natural areas can lead to degradation of natural habitat conditions.

With regard to the RMP, we can only talk about potential impacts in a general way insofar as there is loss or in the amount and diversity of plant and animal life as a result of the loss or degradation of natural habitat areas. Actual impacts can only be judged after the appropriate details are known about each project. Where rare or endangered species occur or in ecologically significant areas, the impacts may become that much more magnified.

Potential Regionally Significant Impacts. The RMP identifies 3,097 lane-miles of roadway projects, 360 miles of rail corridors and 112 adjacent park-and-ride lots, which could cause the loss of regionally significant amounts of terrestrial habitat, or could pose a significant risk to rare or endangered species or regionally significant areas. Roadway construction could require 3,670 acres of land (assuming 12 feet per lane), and the area of land potentially subject to construction impacts (within 100 feet of new

highway construction) could total 21,340 acres.

- I-15 Norco Reach, Riverside County -- This freeway construction project would cause the loss of some coastal sage scrub habitat, pasture land, and fallow fields; destruction of a small amount of riparian habitat at the crossing of the Santa Ana River with potential for interference with the nesting of the endangered least Bell's vireo and possible adverse effects on the rare California yellow-billed cuckoo.[36]

- San Joaquin Hills Corridor, Orange County -- This highway construction project would increase the environmental disturbance in the San Joaquin Hills, most importantly, by removing several local natural habitats: wetlands, coastal sage scrub, chaparral, and oak woodland. The location of the impacts would be Bommer and Shady Canyons' vegetation and wildlife areas, and Bonita Canyon Reservoir and its riparian area.[37]

  Construction of the corridor would remove between 261 to 275 acres of Resource Category 3 plant species (defined as mixed chaparral, mixed coastal sage scrub, oak savannah and oak woodland). As the complete replacement of the lost habitat would be infeasible, an adverse impact would remain. The Corridor would also create a barrier to wildlife dispersion between canyon areas (Shady and Bommer Canyons to canyons to the south).

  Noise generated by the Corridor may affect wildlife behavior, such as nesting, migration, dispersion and hibernation. Other impacts to wildlife will include effects from degradation of air quality, and additional sources of light and glare.

- Eastern and Foothill Corridors, Orange County -- These highway construction projects have the potential to cause substantial loss of oak and riparian woodland vegetation and associated wildlife within Limestone and Santiago Canyons and localized losses within Arroyo Trabuco and Tijeras Canyon, Borrego Canyon Wash and Serrano and Aliso Creeks. They would also induce harassment to wildlife and cause direct loss of prime bird of prey nesting habitat. The lower portion of the Limestone wildlife corridor would also be lost. Further there would be loss of coastal sage scrub and small isolated oak woodland and riparian communities.

  Actual impacts can only be detailed after the alignments have

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[36] FHWA and Caltrans. Route 15 (Norco Reach) DEIS. 1979.

[37] Orange County EMA. San Joaquin Hills Transportation Corridor Draft Environmental Impact Report. DEIR #494, June 1988.

been finalized. Overall, the Santiago segment is more sensitive biologically than the combined Irvine/El Toro segments.[38]

- Route 86, Riverside and Imperial Counties -- This highway construction project could result in a substantial loss of desert scrub habitat and possible damage to mesquite habitat areas and desert washes draining into the ecologically important west Salton Sea shoreline area. It would also pose the potential for adverse effects on the habitats of the endangered desert pupfish, the rare Yuma clapper rail, and the rare California black rail, which are all associated with riparian areas adjacent to the west shoreline of the Salton Sea.

Potential Local Impacts. Apart from these freeway construction projects, the RMP also identifies projects in the urbanizing portions of the SCAG region which could cause minor, localized losses of plant and animal habitat or with a potential of adverse impacts on rare or endangered species or ecologically significant areas depending on selected alignments.

- Los Angeles County -- The Route 7 Freeway Extension would result in minor habitat loss in Arroyo Seco, Monterey Hills. Route 60 Improvements would result in minor habitat loss and potential impacts on upper San Timeteo Canyon. The US-101 Widening is resulting in minor habitat loss at Calleguas and Conejo Creeks, with possible adverse effect on the rare Ventura buckwheat plant.

- San Bernardino County -- Route 30 Freeway Construction would result in minor riparian habitat loss at the Live Oak and San Antonio Washes, Cucamonga and Lytle Creeks. Route 30 Freeway Extension could have potential impacts on Santa Ana River. Route 71 Highway Widening will result in minor habitat loss, and potential impacts on Chino Creek and Prado Basin habitats. The Route 138 Realignment could result in minor habitat loss near Silverwood Lake.

- Ventura County -- Route 118 Widening in Saticoy may result in minor habitat loss and potential impacts on the Santa Clara River.

RECOMMENDED MITIGATION

Project-level environmental assessments on individual projects in the RMP should consider specific mitigation measures to reduce significant biological impacts. Mitigation measures that would reduce the impacts discussed previously include the following:

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[38] Orange County EMA. Foothill Transportation Corridor Route Location Study Draft Environmental Impact Report. Prepared by LSA, January 1983.

- SCAG's Growth Management Plan affirms the following policies:

  (1) Preserve open space areas identified in local, state, and federal plans and those in SCAG's Conservation and Open Space Plan. Preserve, wherever possible, prime agricultural land and open space areas separating communities.

  (2) Limit development or use special design requirements for land with low suitability for development (including significant ecological areas).

- Detailed biological surveys should be conducted prior to adoption of alignments, with consultation with the California Department of Fish and Game and the U.S. Fish and Wildlife Service where significant resources can be adversely affected.

- Alignment selection should be made to avoid areas of resource sensitivity and to minimize the need for large areas of cut and fill or grading which removes vegetation and habitat.

- Vegetation removal should occur only where absolutely necessary for grading with revegetation with appropriate native plants; relocation of trees (e.g., in scarce oak woodland habitat) and acquisition of land can also be employed to replace destroyed habitat.

- Pass-through culverts with earthen floors should be used, as appropriate, to allow wildlife movement under highways and guideways; fencing should be used to prevent ingress by wildlife and undue disturbance to natural areas.

- Construction activities should be scheduled to reduce disturbance to wildlife (e.g., to avoid the breeding season of protected bird species).

- Projects which take place in recognized wetlands must comply with local, state, and federal regulations governing the protection of these areas.

- For projects crossing wetlands and riparian zones, steps should be taken to minimize alteration of the streambed and riparian vegetation; bridges should be constructed to span the entire riparian zone at river crossings, where possible.

- In the coastal zone, coastal zone planning and management programs of local governments in conjunction with the state can serve to reduce or prevent serious impacts on biota along the coast.

- Effective implementation of water pollution control measures (see the Water Resources section) can reduce the adverse effects to biological resources resulting from increased transportation-related water pollution.

4.F. WATER RESOURCES

REGIONAL SETTING

The water resources of the SCAG region are critical for drinking and domestic uses, agricultural and industrial purposes, habitat for biota, and recreation and commerce. In addition, water resources can present flood hazards and are primary determinants of topographic features through processes such as erosion and sedimentation.

The value of water resources depends greatly upon their quality, which includes clarity, mineral content, and absence of toxic metals and organic compounds. Pollutants have been and are introduced into waters of the SCAG region by two sources of discharge: point and non-point. Point source discharges include effluents from sewage treatment facilities and industrial wastewater discharges. Non-point source discharges include runoff and infiltration from urban and agricultural lands. Transportation facilities, primarily roads and highways, have contributed to non-point sources of pollution due to erosion from construction sites and, subsequently, runoff of storm water contaminated by such pollutants as trash, oils, grease, and lead.

Transportation facilities are subject to flood hazards. In addition, by increasing the impermeable surface in the region, these facilities have altered patterns of storm water flow and increased the need for storm water management.

The following sections describe surface and groundwater resources of the SCAG region, along with the quality of these resources.[39] In addition, flood hazards in the region are characterized.

Surface and Ground Water Resources. Major surface and ground water features of the Santa Clara, Los Angeles, and Santa Ana River basin areas, as well as the desert region are described below, with a focus on the quality of these water resources. See Figure 17 for a map of the major surface water features in the non-desert portion of the SCAG region.

The Santa Clara River Basin drainage system includes the following major reservoirs: Lake Piru, Pyramid Reservoir, and Castaic Lake. The water of Lake Piru is relatively hard and of high total dissolved solids (TDS). Pyramid Reservoir and Castaic Lake, formed primarily by water from the State Water Project, generally feature water of high quality. The Santa Clara River is characterized by hard water and high TDS, with quality worsening in the downstream sections. Poor quality is caused primarily by rising groundwater which is high in TDS. Other factors include irrigation return flow, and boron

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[39] A primary source of setting information for the Water Resources Section is SCAG. Environmental Setting: SCAG Region. Prepared by DMJM, October 1978.

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Planning
Consultants
Research

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SCALE IN MILES

LEGEND:

NATURAL SURFACE WATER FEATURES

AQUEDUCTS

Source: SCAG & DMJM, 1978.

Figure 17
SURFACE WATER FEATURES

deposits in the drainage area.

The Santa Clara River Basin contains nine major groundwater basins. Groundwater quality is generally good in the upper Santa Clara River Basin in Los Angeles County, but it worsens near the Los Angeles-Ventura county line. Groundwater quality in Ventura County has been deteriorating over the last few decades from the deep percolation of sewage, irrigation return water, industrial wastes, and saltwater intrusion within the Oxnard Plain due to excessive groundwater extraction.

Smaller water basins in Ventura County include the Ventura River and Calleguas Creek drainage areas. Fair to good water quality exists in the Ventura River drainage area, except in its lower reaches due to naturally poor quality water from Canada Larga Creek, municipal wastewaters, and industrial wastes. The Calleguas Creek drainage area drains into Mugu Lagoon, which has great value as a prime wildlife habitat area.

The major surface water resources of the Los Angeles River Basin include the Los Angeles and San Gabriel River drainage areas. The Los Angeles River drainage area features the Los Angeles River, which drains the hills surrounding the San fernando Valley and empties into Long Beach Harbor. The drainage area has had minor water quality problems due to high pH, nitrate, nitrite, and chlorine levels, and low dissolved oxygen. The Hansen Flood Control Basin is losing capacity rapidly as a result of sedimentation, and the Sepulveda Basin will be the site of future treated wastewater release. Additional surface water features in the area include Ballona creek and Harbor Lake, which provide significant wildlife habitat. Harbor Lake has generally exhibited good water quality; the water quality of Ballona Creek is poor due to low dissolved oxygen.

The San Gabriel River drainage area features the San Gabriel River, which originates in the San Gabriel Mountains and empties into the ocean between Long Beach and Seal Beach. Major features in the drainage area include the Puddingstone, Morris, and San Gabriel Reservoirs. Urban runoff and point source discharges have caused minor water quality problems in the urbanized portions of the drainage system, but good water quality conditions exist in the source areas of the San Gabriel Mountains.

Primary groundwater basins in the area are those of the Los Angeles Coastal Plain, San Fernando Valley, and San Gabriel Valley. The Los Angeles Coastal Plain contains a large amount of groundwater of good quality. Saltwater intrusion has been a problem along the coast, and injection wells have been employed to halt the problem. The San Fernando Valley Basin also contains a large amount of groundwater of generally good quality. Water quality in the San Gabriel Valley Basin has been generally good, with the best quality water found near the San Gabriel Mountains. However, high nitrate and TDS concentrations have caused local problems. In both basins, higher than acceptable levels of trichloroethylene (TCE) and other organics have prompted the limited use or shutdown of some wells.

The Santa Ana River Basin area is drained primarily by the Santa Ana River, which originates in the San Bernardino Mountains. Prominent surface water features include the Prado Flood Control Basin, Big Bear Lake, Lake Skinner, Perris Lake, Lake Matthews, and the San Jacinto River drainage system. Improper operation of individual sewage storage or treatment systems in the upper Santa Ana River area has caused water quality degradation. The lower reaches of the Santa Ana River have had problems with high TDS and nutrient concentrations due to rising groundwater of low quality, urban runoff, and non-point agricultural pollution. Big Bear Lake has experienced some eutrophication problems; Perris Lake, Lake Matthews, and Lake Skinner feature fair to good water quality, as they receive water from the State Water Project or the Colorado River. No significant water quality problems have been noted in the San Jacinto River system except for some problems of high TDS and eutrophication at Lake Elsinore.

The groundwater basins of this area include the basins of the Orange County Coastal Plain and the upper Santa Ana River, and the San Jacinto and Elsinore Basins. The Orange County Coastal Plain has generally good water quality, but problems include deterioration due to recharge by Colorado River water, return of treated wastewater used for irrigation, and seawater intrusion. The latter is being fought with injection wells. The upper Santa Ana River Basin has deteriorated over the last several decades largely because of agricultural effluents and municipal and industrial waste disposal, which have added to TDS and nitrate concentrations. The groundwater resources of the San Jacinto and Elsinore Basins have deteriorated to some extent, primarily because overdraft in some areas has allowed inflows of waters with high TDS and nitrate concentrations.

Major surface water features of the Desert Region include the Colorado River, the Mojave River, the Amargosa River, and the Whitewater, New, and Alamo Rivers, which flow into the Salton Sea. The area has few water quality problems, except for the Salton Sea, which has faced problems of increasing salinity and degradation due to agricultural return flows and municipal discharges.

Groundwater resources include the South Lahontan Basin and the West and East Colorado River Basins. In the South Lahontan Basin in Los Angeles County and much of San Bernardino County, problems include overdrafts and pollution by mining and sewage wastes in areas such as the Antelope Valley, Boron, and Barstow. The West Colorado River Basin, including the Coachella and Imperial Valleys, contains mostly unusable groundwater. In the East Colorado River Basin in the eastern desert areas, the major problem is the increasing salinity of the Colorado River.

Flood Hazards. Flooding is a major natural hazard in Southern alifornia, despite the region's arid to semi-arid climate. The greatest potential for flooding occurs in canyon areas and foothills/plain transition zones downstream from major mountain watersheds. In the coastal areas, flooding is generally caused by high intensity rainfall associated with major storms. The deserts and areas downstream from mountain watersheds are also

vulnerable to flooding caused by occasional summer thunderstorms.

Urban development, including the construction of transportation facilities, increases the potential for flooding as the conversion of land to urban uses increases the amount of impervious surface in the form of roads, buildings, parking lots, and other hard surfaces. Development also reduces the infiltration of storm water where grading exposes bedrock or where compaction of earth materials reduces soil porosity. Because of this additional impervious surface and reduced infiltration, the volume of storm runoff and the peak rate of discharge are increased. Alteration of stream flows by development also increases the potential for flooding. Development occurring below mountainous areas is particularly vulnerable to flooding, since steep canyon slopes and channel gradients allow rapid concentration of large quantities of storm water runoff.

An elaborate system of storm water and flood control improvements has been constructed in the urbanized areas of the SCAG region. These improvements include channels, storm drains, reservoirs, dams, debris basins, and spreading basins. Most of the projects in the Los Angeles County and northern Orange County areas are completed, while construction of new projects is occurring in south coastal Orange County and inland near Riverside and San Bernardino. Improvements for flood control in the desert areas are more limited, due to lack of extensive development. While urban areas generally have better protection than rural areas, they are still potentially vulnerable to damage from large floods.

Existing flood hazard areas in the SCAG region relate to the surface water features identified in Figure 17. While many of these flood hazards have been minimized or controlled through flood control facilities, potential problems remain, depending on conditions that would result from 100- or 500-year flood levels, or where development has outpaced flood control efforts.

There are major differences in existing flood control problems between urbanized and urbanizing portions of the SCAG region: in the urbanized areas, maintenance of existing systems, declining capacity of storm basins, and dam safety are primary concerns. In areas undergoing initial or more intensive development, major projects such as the construction of dams and the channelization of streams are frequently required. While transportation projects might not in themselves present a need for flood control projects, the cumulative effects of preceding, accompanying, or subsequent development could increase existent flood hazard risks to the point where channelization of streams and other efforts might be required.

PROJECT IMPACT

Several projects in the RMP could cause substantial local impacts on water resources, many more could cause minor impacts, and the overall impacts of the RMP on regional water resources could potentially be significant. Despite the RMP's emphasis on transportation demand management and

transportation system management measures, most of which would not have a direct impact on the environment, and which have a net result of reducing future traffic and congestion relative to no project conditions. Nevertheless, the increase in road surface and traffic over existing conditions will result in added runoff and water contaminants from tire wear and exhaust, which can migrate into surface waters after becoming water-borne pollutants with rainfall.

Growth Management. The impacts on water resources of the 1988 Growth Management Plan are addressed in the EIR for that plan. To briefly summarize, these would include the additional demand for water supplies and wastewater treatment in all areas of the Region, but primarily in the inland or outlying subregions where new infrastructure would have to be created; potential surface and groundwater degradation as a result of increased urbanization; and possibly increased sedimentation due to erosion from the construction of new housing and commercial developments in currently undeveloped areas. However, overall, the implementation of growth management mechanisms as contained in the Growth Management Plan, such as Jobs-Housing Balance, could reduce the need for new infrastructure and therefore lessen the severity of indirect impacts on water resources.

The following is a discussion of the impacts on water resources of each of the remaining RMP elements.

Transportation Demand Management (TDM). TDM measures would not have a direct physical effect on the environment. However, the indirect effects would be beneficial to water quality in the SCAG region. Reducing traffic congestion, with an associated decrease in air emissions and roadway surface pollutants, would reduce the level of water-borne pollutants that could migrate to surface and groundwater.

Transportation System Management (TSM). In general, most TSM measures proposed in the RMP would not have a direct physical effect on the environment, but would produce the same indirect beneficial water quality effects described under TDM, above. However the dust and debris and loose soils associated with construction of Smart Freeway Projects and High-flow Arterials could result in pollutants being transported during storms to adjacent surface waters. Given that these projects occur in existing rights-of-way, operation would not add significant impervious surface to the region's inventory. Adverse impacts from TSM would therefore not be significant or long-term.

Mixed-Flow Facilities. RMP projects involving construction of new freeway or arterial links would have potentially greater adverse impacts than projects that involve only the widening, upgrading, or realigning of existing roadways.

The RMP proposes and endorses new corridors which have the potential for causing localized impacts on the quality of certain surface and groundwater resources in the region. This could occur through the following

events:

- Erosion from construction sites during clearing and grading operations and from cut and fill slopes left exposed after construction which can contribute to the sedimentation of adjacent surface waters and ultimately, deposition of sediments in downstream locations. This would be significant where reservoirs, flood control basins, or natural wetlands are located at nearby, downstream sites.

- The increased impervious surface area which could contribute to the degradation of adjacent water resources. Pollutants that would result from vehicular travel related to normal roadway/freeway operations, including trash, oils, grease, lead and other toxic metals, pesticides and fertilizers, and accidental spills of transported materials can drain from roadway surfaces into adjacent water bodies during rainstorms.

- The effect on patterns of surface water flow and infiltration, especially during storm or flood conditions. The increases in impermeable surface area can result in increased local surface runoff during storms, and reduced infiltration of water into soil or rock. This may cause added flows to storm drain and flood control systems and may reduce groundwater replenishment.

- The alteration of drainage patterns at stream crossings, depending on the design of bridge supports or the use of culverts, by changing the speed, direction, and amount of stream flow. Such alterations can change erosion processes and adversely effect downstream water quality.

In addition, the effects of added runoff of polluted surface water resulting from the construction and operation/existence of new freeways, could produce localized impacts on marine water resources. The surface water runoff would collect in storm drains and river channels, with eventual discharge to the sea, mainly during storm conditions. The water pollution effects would be most noticeable at discharge points, estuaries, and enclosed bays where the diluting effects of currents and tidal activity are reduced.

New freeway projects in flood hazard areas would also be subject to damage by flooding and would thereby pose a safety hazard to users during flood conditions, depending upon the flood protection measures built into the projects.

The freeway construction projects in the RMP are expected to result in the construction of about 2,200 acres of new impermeable surface area in the region, or an addition of less than one percent to the existing impermeable surface area. In general, new corridor projects in the RMP would be expected to have potentially more adverse impacts than projects consisting of widening, upgrading or realignment because more grading would likely be involved, new stream crossings might be required, and more new paved surface area would be developed.

Table 11 is a listing of highway and transit projects in the RMP and the specific water resources that would potentially be impacted. The following is a discussion, by county, of the new corridors that would have substantial local impacts.

In Los Angeles County, the Century Freeway (I-105), currently under construction, and Long Beach Freeway (I-710) gap closure would be traversing urbanized areas which are already largely paved over. However, storm water runoff from road construction and operation of I-105 could contribute to the degradation of the Los Angeles and San Gabriel Rivers, Rio Hondo, and Dominguez Channel, while I-710 could have similar impacts on Arroyo Seco. The EIRs for these projects address such impacts more specifically.

The construction of the San Joaquin, Foothill, and Eastern Corridors in Orange County involve substantial additional pavement to largely natural areas. All of these projects are currently under EIR review. The increased impervious surface area would add significant pollutants into adjacent drainage areas along the proposed corridor alignments. Grading and construction work could result in erosion of temporarily exposed ground surfaces, particularly cut and fill slopes. Runoff from construction of the 14 miles of the San Joaquin Corridor could transport pollutants and sediment to Bonita Canyon Reservoir and Upper Newport Bay Ecological Reserve. Upper Newport Bay is already experiencing severe sedimentation. Construction of the San Joaquin Corridor could also result in stream flow alterations, pollutant impacts, and flood hazards due to crossings of a number of Creeks, including Aliso Creek, Laguna Canyon, and Oso Creek.[40]

By crossing Peter's Canyon Wash and Santiago and Handy Creeks, the Eastern Corridor in Orange County could have the adverse impacts of stream flow alteration, water quality degradation and flood hazards. Also, the Eastern Corridor could impact groundwater recharge areas near the Santa Ana River.

Three major watersheds in which the Foothill Corridor would be situated are the San Juan Creek, San Mateo Creek, and Prima Deshecha Watersheds. Although many of the creeks in this area already exhibit degraded water quality in the form of high nitrate, TDS, and turbidity, construction and operation/existence of this new corridor could significantly contribute to the degradation of watercourses that would be crossed.[41,42]

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[40] Orange County EMA. San Joaquin Hills Transportation Corridor Draft Environmental Impact Report. June 1988.

[41] Orange County EMA. Foothill Transportation Corridor Christianitos Segment Environmental Baseline Study. Prepared by Michael Brandman Associates, September 1986.

TABLE 11

RMP PROJECTS - POTENTIAL WATER RESOURCE IMPACTS

Project	Resource Potentially Impacted	Type [a]
Los Angeles County		
Century Fwy (I-105)	Los Angeles and San Gabriel Rivers, Rio Hondo, Dominguez Channel	WQ
Long Beach Fwy (I-710)	Arroyo Seco	WQ
I-5	Los Angeles and San Gabriel Rivers	WQ
SR-138	Silverwood Lake	WQ
US-101	Calleguas and Conejo Creeks	FL, WQ
SR-118	Santa Clara River	FL, WQ
Wilshire MetroRail	Described in Text	WQ
Glendale/LA CBD Guideway	Los Angeles River	WQ
U.S. 101	Los Angeles River, Sepulveda Dam	WQ
Orange County		
San Joaquin, Foothill, and Eastern Corridors	Described in Text	FL, WQ
SR-57, SR-91	Santa Ana River groundwater recharge area	FL, WQ

(a) Key: FL - Potential alterations to flow regime, flood impacts.
WQ - Potential water quality impacts.

(continued)

[42] OCTC. Multimodal Transportation Study Plan Refinement. November 1980.

TABLE 11 (continued)

RMP PROJECTS - POTENTIAL WATER RESOURCE IMPACTS

Project	Resource Potentially Impacted	Type [a]
Riverside County		
I-15 Norco Reach	Santa Ana River, Temescal Wash	FL, WQ
SR-86	Salton Sea, Alamo and New Rivers	WQ
San Bernardino County		
SR-30	Santa Ana River	FL, WQ
SR-71	Prado Basin	FL, WQ
Ventura County		
SR-126	Santa Clara River, Santa Paula and Sespe Creeks	FL, WQ
SR-118	Santa Clara River	FL, WQ
SR-23	Wood Ranch Reservoir, Calleguas Arroyo, Arroyo Canajo	WQ

(a) Key: FL - Potential alterations to flow regime, flood impacts.
WQ - Potential water quality impacts

Source: Planning Consultants Research 1988, based on specific project EIRs where applicable.

The Norco Reach (I-15) in Riverside County is currently under construction, with potential impacts on the water quality of the Santa Ana River and Temescal Wash.

Route 30 in San Bernardino County is also currently in EIR review. The project involves an addition of approximately 28 miles of paving, six lanes wide, with potential stream flow alterations, pollutant impacts, and flood

hazards due to crossings of the following streams and drainage courses: Live Oak and San Antonio Washes; Cucamonga, Day, Deer, and Lytle Creeks; and other lesser foothill drainage channels.

The upgrading of existing roadways that could have water quality impacts includes SR-138 in northern Los Angeles and San Bernardino Counties, and SR-71 in San Bernardino County, both of which could have flooding and water quality impacts on Prado Basin. In Riverside and Imperial Counties, the upgrade of SR-86 could have stream flow alteration, pollutant, and flood hazard impacts on San Felipe Creek, the New River, and the Whitewater River delta. SR-86 also poses a potential threat to the water quality of the Salton Sea since it parallels its shoreline and crosses numerous drainages leading to it. The SR-23 project in Ventura County crosses largely agricultural lands and could pose water quality impacts on Wood Ranch Reservoir, Calleguas Arroyo, and Arroyo Canajo.

The widening and double-decking of freeways in the RMP would not have significant water quality impacts because many of these routes already have adequate rights-of-ways for expansion. However, there could be short-term impacts due to potential storm water runoff of dust and debris associated with construction, as well as an overall increase in water-borne pollutants because of the combination of additional impervious surface and increased vehicular traffic.

Transit Facilities. To the extent that RMP transit facilities would be built within the urbanized portions of the SCAG region, they would not involve notable increases in impermeable surfaces (pavement). However, sources of water pollution could be associated with the added surface runoff pollution from transit facility parking lots and from centralized transit vehicle washing facilities and minor, short-term water quality impacts could occur during the construction of rail projects along existing rights-of-way and guideways along existing highways. In general, however, transit facilities would not have significant impacts on water quality. Also, as transit facilities would reduce traffic congestion and promote a greater reliance on rail systems that produce less air emissions, and oil, grease, and other pollutants on roadway surfaces, there would be an overall indirect benefit on regional water resources compared to a more roadway-intensive approach.

However, with rail lines along new rights-of-way, as with the new corridors discussed above, problems with respect to erosion during construction, and stream crossings could occur. The RMP projects in this category include: MetroRail; Glendale to LA CBD guideway; and Century Freeway (I-105) Light Rail Transit.

The Wilshire MetroRail poses unusual water quality problems because tunneling for this project would require extensive dewatering of shallow groundwater deposits and muck disposal. As the removed water and muck is

expected to be contaminated with oil and tar, there would probably be a need for wastewater treatment and possible transport of muck to a Class I or Class II-1 landfill.

Non-motorized Transportation. The greater use of bicycle and pedestrian modes would have indirect beneficial effects on water resources by reducing traffic congestion and the associated air emissions and roadway surface pollutants that could migrate to surface and ground waters.

Air Quality Management Plan Conformity. Inclusion of the AQMP Transportation Control Measures in the RMP will have a positive indirect effect on regional water quality by reducing the level of traffic congestion and the associated air emissions and roadway surface pollutants that could migrate to surface and groundwater.

RECOMMENDED MITIGATION

Project-level environmental assessments on individual projects in the RMP should consider specific mitigation measures to reduce water resources impacts. Mitigation measures that would reduce the impacts discussed in this report include the following:

- SCAG's Areawide Waste Treatment Management Plan (208) Plan contains measures that would reduce the water quality impacts of transportation improvements, including specific Best Management Practices for erosion and sediment control for construction sites that local governments could adopt; maintaining and improving street cleaning and litter control programs; and catchbasin, inlet basin, and storm drain cleaning.

- For new and improved transportation facilities, compliance should be sought with federal, state, and local policies, standards, and land use strategies which address water resource impacts issues. These would include programs and regulations of the State Regional Water Quality Control Board, the California Department of Fish and Game, local flood control districts, and the U.S. Army Corps of Engineers.

- Alignments of transportation facilities should be adjusted to avoid flood hazards, increase distances from important water resources, and reduce the need for severe cuts and steep embankments.

- Construction should be scheduled during the dry season, when possible.

- Erosion control measures and runoff management, such as drainage

channels, detention basins, and vegetated buffers, should be employed to prevent pollution of adjacent water resources by runoff from transportation facilities. Wherever physically feasible, detention basins should be equipped with oil and grease traps which should be cleaned regularly. Treatment and disposal of excavated materials should be well-planned.

- Natural conditions should be maintained or simulated wherever possible to minimize effects at stream crossings. Single-span bridges should be used when feasible.

- Greater use of permeable surfaces and channelization of flows to recharge areas should be sought to promote water percolation and removal of metals.

- In the coastal zone, coastal zone planning and management programs can reduce adverse impacts to coastal water quality and preserve or improve areas of special water quality significance such as bays and estuaries.

4.G. VISUAL RESOURCES

REGIONAL SETTING

Transportation systems have a major influence on human perception of the visual environment. In urban areas, roadway rights-of-way comprise 20 to 30 percent of total land area (2.4 acres per 100 residents).[43] As most vehicular movement occurs along transportation corridors, their placement largely determines what parts of the SCAG region will be seen. Even for people not using transportation at a particular time, or who never use certain modes of travel, transportation systems are usually a dominant element of the visual environment. Each type of transportation system creates its own unique visual character for both the utilizer and the viewer.

Arterials and Freeways. These comprise a major component of the existing visual environment of transportation systems in Southern California. Arterials in the region offer a variety of visual experiences: uncrowded, undeveloped stretches of rural roads in Imperial, San Bernardino, Riverside, and northern Los Angeles counties; narrow winding roads in the mountain areas; and high-volume urban streets in the densely populated areas of Los Angeles and Orange counties.

For the driver or passenger, surface streets in the urban areas contain an abundance of visual stimuli - including buildings, signs, traffic, pedestrians, and scenic vistas. Freeways, while faster moving and carrying a heavier volume of traffic, offer a much less crowded visual experience - landscaped embankments and limited access buffer the driver from many of the chaotic elements of surface street travel. Freeway travel can be both frustrating and an aesthetic pleasure: as one writer describes it, "...by rising above the sea of one-and two-story buildings, freeways open up new vistas at the sunset hour. The motorist who is temporarily stranded at rush hour on a connector road - say the Santa Monica to the San Diego, or the Hollywood to the Harbor - can enjoy some of the finest views of Los Angeles."[44]

As shown on Figure 18, there are several officially designated State Scenic Highways in the SCAG region, and numerous eligible state highways that are not officially designated. The official state scenic highways in the region include SR-2 in Los Angeles County; a portion of SR-38 in San Bernardino County; a portion of SR-91 in Orange County; and SR-243 and

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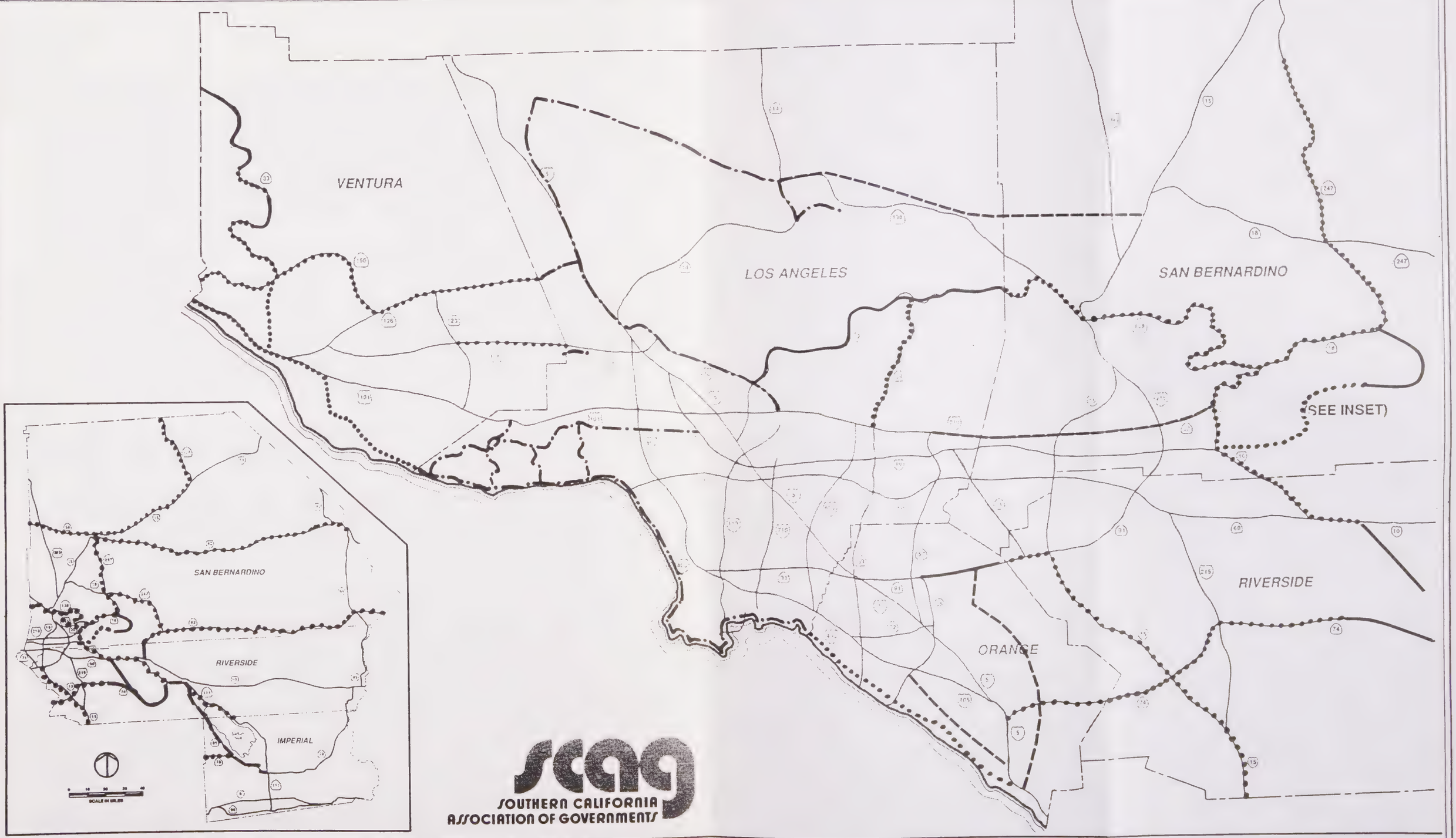
[43] National Commission on Urban Problems. Land Use in 106 Large Cities. Research Report 12, 1968.

[44] Brodsley, D. LA Freeway. UC Press, 1981.



SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Planning Consultants Research

0 10 20
SCALE IN MILES

LEGEND:
- STATE DESIGINATED
- STATE ELIGIBLE
- COUNTY DESIGINATED
- RECOMMENDED MITIGATION

Source: CALTRANS, 1988.
Los Angeles County General Plan, 1975.

Figure 18
SCENIC ROUTES

portions of SR-74, and 62 in Riverside County.[45] Properly designed, highways can provide new visual access and have a beneficial visual effect for the millions of motorists that use them. The State's Guidelines for Scenic Highway Designations acknowledge that, "the tremendous population increase and growth of California will necessitate the development of existing State highways in scenic areas and the construction of new State highways through scenic areas which should be constructed or developed giving the utmost attention to scenic values."[46] To this end, local jurisdictions are expected to prepare and adopt local General Plans and related programs to protect and enhance scenic corridors, including:

1. Regulation of land use and density of development;

2. Detailed land and site planning;

3. Control of outdoor advertising;

4. Careful attention to and control of earthmoving and landscaping; and

5. Design review authority over the design and appearance of structures and equipment.

In addition to the State designations, counties in the region have their own scenic highway designations which are primarily intended to preserve and enhance existing scenic resources.

The visual character of freeways themselves depends on the scale at which observers view them: above and from a distance, freeway traffic forms a compelling contribution to the scenery, whether by lights moving at night or the changing visual character of daytime traffic. From below and at close range, freeways are often cement barriers to views of near and distant scenery.

Transit. This transportation mode is currently a small contributor to the movement of people through the region, consisting mostly of buses, which also use the arterial and freeway network. Buses, which are pervasive in urban areas, constitute the greatest visual contribution of transit to the existing environment of the region. Since buses use local streets, arterials, and freeways, the only additional infrastructure they require includes terminals, storage and service yards, and bus stops. These do not comprise a major component of the visual environment of the region, although buses and bus stops are numerous along high-volume streets, and shelters or

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[45] California State Department of Transportation. California State and County Scenic Highways. March 1988.

[46] California State Department of Transportation. Guidelines for the Official Designation of Scenic Highways. April 1988.

benches with advertising are noticeable. Views from buses are frequently better than from automobiles, as the rider is both physically and psychologically above the traffic.

A secondary transit mode in the region is passenger rail operations (AMTRAK and Caltrain), which occupies existing railroad tracks. In terms of routes and overall passengers served, this mode is rather limited.

Freight railroads occupy long-term rights-of-way, and influence the development of adjacent land uses. In the central cities, railroads generally traverse commercial and industrial areas, and in the outlying areas, railroad rights-of-way generally follow open space that may now be under development for residential and other uses. Railroad infrastructure does not form a dominant element of the visual environment and walls and shrubbery are often used to buffer railroad tracks and storage yards from view.

Air Pollution. The relationship between visual characteristics of the SCAG region and air pollution should be noted: photochemical smog and suspended particulates curtail scenic views during many days of the year, particularly in the summer.

PROJECT IMPACT

Overall, the RMP's impact on the visual environment would be beneficial primarily because traffic congestion, and the air pollution associated with traffic, would be reduced on a regional level. However, some local areas will require facilities that would result in adverse visual impacts.

Perception of the visual impacts of additions to the transportation network depends on three elements: the biases of the viewer; the extent to which additions disrupt existing views; and whether they are aesthetically pleasing or displeasing in themselves. For example, similar projects would have different effects on the visual environments of rural versus urban areas, or on residential versus industrial or commercial centers of a city. Although visual disruption might be less in urban or commercial areas as compared with rural or residential areas, there would be a greater number of potential viewers of a transportation project in more heavily populated areas.

The following factors, related to the transportation projects themselves, influence visual impacts perceived by both nonusers and users.[47]

- o Scale - the size, proportion, and suitability, or "fit," of a transportation improvement to the surrounding development.
- o Coherence - the extent to which the improvement allows the continuation,

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[47] US DOT. Guidelines for Assessing the Environmental Impact of Public Mass Transportation Projects. UMTA-IT-060049-79-1, 1979.

or adaption, of existing activities. Coherence also applies to the compatibility of the design of the improvement with existing architectural forms and patterns.

- o Degree of Visibility - the extent of which the transportation improvement can be seen. This depends, to a large extent, on the selection of the route, alignment, and configuration (e.g., elevated, at grade, depressed, or underground) of the improvement. Visibility from the system will often vary in relation to the visibility of the system itself.

- o Color and Light Values - contrasts between light and dark, and variations in colors and shadows as a means of identity. A transportation facility can be made to blend with surrounding features through approximation of existing colors. Shadows are more difficult to blend with the existing environment, and at certain times of day can have a pronounced visual effect.

- o Texture - materials used in the fixed components (e.g., bridges, guideways, and buildings) of transportation systems, can be in conformity or discord with those of adjacent development.

- o Speed - where attention is attracted in contrast with surrounding transportation systems, especially when different transportation modes, such as buses/transit vehicles on freeway medians, share adjacent rights-of-way with automobiles.

Views of and from transportation facilities can be described in two ways: (1) vistas, or channeled views; and (2) panoramas, or side-sweeping views without a single focus. Introducing a transportation improvement to a vista may be considered to have greater impact than to a panorama because of the vista's relatively limited range of vision.

At a local scale, types of potentially significant visual impacts would include: disturbance of any existing view which has aesthetic value; construction phase disorder, including dust, presence of equipment, and activity; and new structures of a scale, color, shadow, and location or orientation that do not conform with the surrounding environment.

Regionally significant impacts would include:

- o Disruptions of important vistas, such as of mountains, oceans, rivers, or significant manmade structures;

- o Marked contrasts with the scale of a project's, or group of projects', surroundings; or

- o High visibility due to large numbers of viewers using the area near the project or projects.

The visual impacts of the 1988 Draft Growth Management Plan growth assumptions are briefly summarized as part of the EIR for that Plan. These would include the visual impacts of providing new housing and infrastructure in areas of the region that are currently largely undeveloped or have had limited development to date, such as the desert portions of San Bernardino and Riverside Counties, and inland portions of Orange County. Growth experienced in urbanized areas of the region would generally have less visual impact because the infrastructure is largely in place. In cases where such growth induces the replacement of existing older housing stock and public facilities, a beneficial visual effect could result. Overall, the implementation of growth management mechanisms as contained in the Growth Management Plan, such as Jobs-Housing Balance, would reduce the need for new infrastructure and would therefore lessen the visual impacts associated with growth in the region.

The following is a discussion of the visual impacts associated with each of the RMP elements. In general, the RMP's emphasis on Transportation System Management and Transportation Demand Management measures and on utilizing existing transportation corridors and transit facilities, minimizes the potential for significant regional visual impacts. The significant visual impacts of aerial portions of proposed facilities present mitigation opportunities for operating agencies, however the RMP's emphasis on reducing facility construction would have an overall positive visual effect for transportation facility users and neighboring viewers by relieving the negative picture of traffic congestion and reducing air pollution throughout the region.

Transportation Demand Management (TDM). As with TSM, TDM measures would not have any direct physical effect on the environment. However, the indirect effects would be visually beneficial because of the resultant relief in traffic congestion.

Transportation System Management (TSM). The Smart Freeway Program can only have a positive visual impact by decreasing the negative visual impact of traffic congestion for both the user and the adjacent community viewer. However, the Superstreet project for SR-39 would involve an upgrading and widening that would encroach on surrounding residential areas and open terrain. Beach-Hacienda Boulevard (SR-39) crosses and would thereby interrupt the visual atmosphere of land that Los Angeles County has acquired to develop into Otterbein Park with a wilderness theme. Superstreets enhance local visual character when high-flow arterials are built into below-grade depressions or adjacent to cul-de-sacs; however, superstreet flyovers result in obstructed views and with improper design can have as much impact as a new freeway.

Proposed high-flow arterials would involve improvements to existing roadways and therefore would not have as significant visual impacts as the construction of new corridors. However, by controlling access to the roadway,

the community traversed is in effect divided, which could result in an overall visual impact. Grade separations associated with these facilities would also create visual intrusions. However, where cul de sacs are created along the arterials there would be local visual enhancement.

As the other proposed TSM measures (ramp meters and bypasses, parking management, etc.) would either have no direct impact on the physical environment or would consist of minor enhancements to existing systems that would result in improved traffic flow, TSM would have the positive visual impact of relieved traffic congestion for both transportation facility users and nearby viewers.

High-Occupancy Vehicle (HOV) Facilities. HOV facilities would involve minimal changes in the visual environment that would generally be visible only to drivers and occupants of vehicles using existing roadways. Any visual impacts on neighboring communities would be additions to existing visual impacts of the roadway from such things as carpool lane dividers and signage, and would quickly be integrated into the local view. The changes in the visual environment would include dust and temporary disruption caused by construction equipment and activities, vehicles moving at higher speed than other traffic, and increased lighting. The I-10 HOV extension to Union Station would potentially be visible to a large number of people in downtown Los Angeles, with accompanying changes to the existing visual character of Union Station. In general, however, HOV facilities would have a positive visual impact by creating more efficient use of freeway facilities and thereby decreasing the negative visual impact of traffic congestion.

Mixed-Flow Facilities. Projects involving construction of new freeway or arterial links would have more visual impacts than projects that involve only the widening or upgrading of existing roadways. Visual impacts would be greatest in areas that are currently undeveloped.

Visual impacts would occur in two stages in new corridors: the temporary construction phase and the longer phase of operation and existence. Of the two new corridors that are currently under construction, Norco Reach (I-15) in Riverside County would have significant visual impacts because it will traverse largely agricultural land. The Century Freeway (I-105) in Los Angeles County, will have visual impacts by virtue of being located in a populous area: an area in need of aesthetic rehabilitation rather than additional degradation. The specific visual impacts and mitigation measures for these projects currently under construction are discussed in their respective Environmental Impact Reports.

The new planned corridors that would traverse open space, including hilly, mountainous, or agricultural areas, are: San Joaquin, Foothill, and Eastern Corridors in Orange County; and Route 30 in San Bernardino and Orange Counties. These projects would have a significant overall visual impact by interfering with high quality vistas and contrasting with the existing

undeveloped character of the area. The Corridor facilities themselves and the cut and fill slopes resulting from grading would be visible from nearby developed areas. Views of the projects would depend on the location of the observer, but would generally consist of freeway facility overhead lighting, motorists, ramps, and interchanges. These new corridors would also contribute to opening up new areas for urban development. However, a positive affect would be achieved for motorist/visitor usage by creating access to significant views which were previously inaccessible to the public, making these corridors potentially eligible for State or County Scenic Highway designation.

The visual resources and characteristics of the San Joaquin Hills are incorporated into Orange County's Master Plan of Scenic Highways. The proposed San Joaquin Corridor intersects with roads which have been designated by the Master Plan as Viewscape and Landscape Corridors, indicating that they are scenic resources. The San Joaquin Corridor may also have visual impacts on existing parks, including Bommer Canyon Park and Crystal Cove State Park. Measures such as landscaping, slope rounding and contour grading would minimize the visibility of Corridor features.[48]

The proposed Route 30 corridor would follow an existing street at the edge of a developing urban valley region, adjacent to agricultural lands. While this corridor could interfere with the view of the mountains to the north if it is constructed above grade, with proper design it would afford motorists views of the mountains without the need to contend with existing cross-traffic.

The extension of I-710, the Long Beach Freeway, through South Pasadena would visually intrude upon the surrounding community by crossing an existing fully developed residential and commercial area. Related to this visual impact would be effects on local historic structures as discussed in Section 4.I. Cultural Resources. While the visual character of this corridor would tend to conform with the existing visual environment of the developed area, it would also attract attention and have more viewers than in a more isolated area. The I-710 project would have the additional visual impacts of altering the terrain of the Monterey Hills and removing thousands of mature trees.

Most of the planned improved corridors are in areas that are currently agricultural. The SR-71 improvement in San Bernardino and Orange Counties would involve controlling the access to an existing arterial in the Chino Hills. The area along an arroyo on the south side of the proposed connection between Routes 118 and 23 in Ventura County is also presently agricultural, and SR-86 in Riverside and Imperial Counties is currently desert open space and agricultural. Agricultural lands are considered a vanishing visual resource and are already undergoing some development.

The improvements to SR-138 would occur in an area of the San Bernardino

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[48] Orange County Environmental Management Agency. San Joaquin Hills Transportation Corridor Draft Environmental Impact Report #494. June 1988.

Mountains, which is also a visually sensitive area. SR-395 in Riverside County, however, would traverse relatively flat, suburban areas. Aside from the visual impacts that would occur during project construction, the effects of improving the corridors by controlling access would not be that visually intrusive. These improvements would generally be a visual enhancement by allowing motorists views of the surrounding scenery, unimpeded by frequent cross-traffic.

Additional roadway improvements are planned through lane-additions and widenings. Included in this category are the double-decking (creating aerial lanes above existing freeway lanes) of US-101 between SR-27 and SR-110, and I-5 between US-101 and the Orange County Line. Double-decking these freeways would have a significant visual impact on surrounding communities and freeway users during construction - dust and equipment as well as increased traffic congestion. The operation/existence of the aerial lanes would also be visually intrusive. Traversing highly populated areas, the elevation and scale of the decks would contrast sharply with the primarily low-rise surrounding communities.

The RMP projects involving the adding of lanes to existing roadways would be generally minor additions to the existing visual environments. The rights-of-way for these projects are already taken in the as-built design and any additional lanes would not require further encroachment into the surrounding visual environment. The primary visual impacts of these projects would therefore occur during construction, with any changes losing their importance over time as they become incorporated into the known view.

Transit Facilities. Transit facilities would be built primarily within the heavily urbanized portions of the SCAG region and would consequently affect a large number of viewers. Transit facilities can be dominant visual elements because of their fixed structures, including rails, guideways, terminals, service facilities, and parking lots, and their large vehicles, such as buses and trains. While these facilities would become integrated with the urban scenery over time, their initial effect may be to block a pleasing view or occupy an area that was previously vacant.

The RMP transit projects fall into three general categories of visual impacts: (1) rail projects along new rights-of-way; (2) rail projects along existing rail rights-of-way; and (3) guideways along existing highways. The first two categories of projects would cumulatively have a significant visual impact in the region, while the third category would not.

The construction and use of rail lines along new rights-of-way would have the greatest visual impacts of any of the transit facilities proposed in the RMP. New rail development would have the same regionally significant impacts as new roadway construction, discussed earlier. The RMP projects in this category include: MetroRail, Glendale to Los Angeles Central Business District (LA CBD) guideway; I-405 Corridor rail from Sylmar to Long Beach; North/South rail from Anaheim to Costa Mesa; and Century Freeway (I-105) Light

Rail Transit. The Glendale to LA CBD and I-405 Corridor projects also have HOV options.

Although the initial leg of MetroRail is proposed as a below grade (subway), accompanying facilities would require modifications of buildings and sidewalks along its route, introducing new elements into the visual character of the urban area. As with the Century Freeway Light Rail Transit, the LA CBD transit would probably be elevated and its structures and movement would be highly visible in an urbanized area. The LA CBD transit and other new rail projects would also introduce new lighting and shadow effects in the areas where they are built, particularly if they are built as elevated structures. The other proposals for new rail are currently being studied with different alignments, therefore local impacts are uncertain.

Rail projects along existing rights-of-way comprise the largest group of transit projects in the RMP, with more than 15 potential projects. These include all of the commuter rail projects and potentially most of the light rail projects, although some of the light rail projects may use surface streets for portions of their routes, at-grade or elevated. Because of the large number of projects and the increase in rail activity they would introduce to the region, this group of projects could collectively have regionally significant visual impacts.

A small amount of new construction would be required for individual projects: new tracks would be needed in some areas, and these, along with possible terminals and parking facilities would generally be built along existing, developed rights-of-way. The major change in the visual environment would be an increased frequency of trains, and in some cases the reintroduction of trains to an area where trains have long been discontinued or tracks have been infrequently used. For example, a light rail is proposed for the Atchison, Topeka and Santa Fe Railway lines from Redondo Beach to El Segundo, which are not currently in use.

Also, light rail use is proposed for the Southern Pacific Railway tracks from LA CBD to Santa Monica along Exposition Boulevard. It is possible that over time these light rail projects would become visual resources in the urban landscape they would traverse. However, the near-term visual changes created by these projects would be regionally significant.

Orange County hosts several projects for guideways along existing highways: HOV lanes or rail guideways are proposed for I-5, Route 91, Route 55, and Route 22. In Los Angeles County, an aerial transitway (bus guideway) is proposed for SR-110, and an extension is proposed of the I-10 El Monte busway to Union Station. As with HOV lanes discussed earlier, the impacts of most of these projects would not be significant as they would involve minimal changes in the visual environment that would generally be visible only to drivers and occupants of vehicles using existing roadways. Any impacts on neighboring communities would be additions to existing visual impacts of the roadway and the guideway would quickly become integrated into the local view. Aside from the visual impacts of construction, the major changes to the visual

environment would include increased lighting; new types of vehicles operating at higher speeds than other traffic; and structures at ground level separating guideway traffic from other traffic. However, some projects, like the SR-110 aerial transitway, may also have elevated guideway structures that could have a dominant visual effect, with consequently significant local visual impacts.

Non-Motorized Transportation. Bikeways represent a positive visual effect. They generally do not involve much new construction and could result in a reduction in the use of motorized vehicles and a concomitant reduction in air emissions. Also, where bikeways are safely removed or separated from automobile traffic they provide a pleasing visual effect for both bikers and passersby.

Air Quality Management Plan Conformity. Inclusion of the AQMP Transportation Control Measures in the RMP will have a positive visual effect on the SCAG region by reducing the level of traffic congestion and air pollution.

RECOMMENDED MITIGATION

Adverse visual impacts of proposed transportation facilities can be reduced through design, the specific aesthetic elements of which must be determined on a case by case basis. The following general considerations should be incorporated in the aesthetic design of facilities to reduce their visual impact:

- Enhancing existing environmental design resources and/or minimizing displacement of these resources;
- Minimizing negative proximity effects, such as incompatibilities of physical scale;
- Minimizing negative barrier effects, such as impairment of views or disruption of design continuity;
- Capitalizing on opportunities to spatially unify an area.

Types of measures that may contribute to the achievement of these objectives include modification of a facility's alignment, profile, cross-section, or other dimensional characteristics. In addition, measures focusing on landscaping, lighting, and signage may also be effective.

For new freeway corridors, especially in hilly areas, various specific design elements that should be considered include:[49,50]

- Recontouring adjacent landforms where affected by corridor improvements to provide a smooth and gradual transition between modified landforms and existing grade and to avoid the appearance of manufactured grading.
- Recontouring cut and fill slopes where feasible to vary the contour to create a more natural appearance.
- Using berms and landscaping to screen views of the facility.
- Selecting landscape materials that recognize the opportunities for enhancing slope landform variation, erosion control, and fire retardation, including natural vegetation in appropriate locations and densities to fit into the natural setting.
- Considering split-level roadways to conform to the terrain, and bridges, structures, or tunnels where appropriate.
- Longer bridges across canyon crossings in order to retain views.
- Considering special structural design provisions (bridge type selection) to develop architectural design theme for each corridor.
- Coordinating between implementing agencies (TCA, Caltrans, Counties) and local jurisdictions to apply design review procedures as appropriate and necessary to minimize adverse effects of new construction.

In addition to the measures cited above, planned corridors in largely undisturbed viewsheds should be considered for State or County Scenic Highway designation in advance of construction. Potentially eligible new corridors in the RMP would include: the San Joaquin, Foothill and Eastern Corridors in Orange County, and SR-30 in Los Angeles and San Bernardino Counties, as indicated in Figure 18. A Scenic Highway designation would help ensure that the facilities' alignment, design, and structures, as well as surrounding new development, would be planned and constructed with a high priority for scenic values.

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49 Orange County Environmental Management Agency. San Joaquin Corridor Draft Environmental Impact Report. 1988.

50 Orange County EMA. Foothill Corridor Environmental Assessment: Route Alignment. 1979.

4.H. NOISE

REGIONAL SETTING

Noise is defined as unwanted sound. Its effects on humans can range from annoyance and interference with various activities to hearing loss and stress-related health problems.[51] Annoyance and feelings of dissatisfaction are typical subjective responses which may occur with very low and relatively infrequent noise levels. In addition, infrequent noise can prevent or interrupt sleep, interfere with speech, and contribute to fatigue and reduced work performance. Noise can also create psychological stress which may be manifest physiologically by increased blood pressure, muscle tension, and cardiovascular problems, and by emotional problems and antisocial behavior.

The SCAG region is fortunate to enjoy a population density of persons lower than other major cities of the United States, especially those on the east coast. Because of its rancho history and the wide availability of land, density of development in the region is still relatively low. Although downtown Los Angeles and other employment centers and corridors support fairly high densities (see Section 4.K. - Urban Form and Growth), the noise levels there are still under control.

The major contributor to the region's noise pollution are transportation related noise sources. The multi-centered nature of the region's development has necessitated the building of an intensive network of freeways to facilitate travel from one place to another at fast speeds.

This section will provide a setting for understanding the noise issue by discussing:

- o noise measurement and exposure,
- o noise standards and regulations, and
- o transportation noise sources.

Noise Measurement and Exposure. Irritation from noise is caused by actual intensity of the sound itself and the persistence of that loudness; measurement of noise must therefore take both aspects into consideration. Noise intensity is commonly measured in decibels (dB). The decibel scale is logarithmic, with zero representing the lowest sound level detectable. The A-weighted decibel scale (dBA) weights the measured values of sound by frequencies, to more closely match human perceptual sensitivity. Sound levels above 60 dBA are considered unpleasant to the human ear, and prolonged exposure to levels above 80 dBA can cause auditory damage.

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[51] US Council on Environmental Quality. Environmental Quality. 1979.

To account for persistence of loudness and variations over time, noise measurements are often expressed by a statistical descriptor such as an exceedance level, L_x, where "x" refers to the percentage of time a noise level is exceeded. L_{10}, L_{50}, and L_{90} are frequently used to describe peak, median, and background noise levels, respectively. L_{max} expresses maximum noise level and L_{eq} expresses the energy-averaged sound level. Other widely-used statistical descriptors are: (1) the day-night sound level, Ldn, a weighted average level adjusted to impose a 10 dB penalty on noise during the 10:00 pm to 7:00 am period; and (2) the community noise equivalent level, CNEL, an average level adjusted to impose a 5 dB penalty for noise between 7:00 pm and 10:00 pm, and a 10 dB penalty for noise occurring during 10:00 pm and 7:00 am. All of these descriptors are commonly reported on the A-weighted decibel scale (in dBA).

Outdoor noise levels are highly variable. Levels (L_{dn}) occur as low as 30 to 40 dBA in wilderness areas and as high as 85-90 dBA in urban areas. A normal suburban community would have a typical ambient noise level of 55 dBA, a very noisy urban residential area, up to 70 dBA. In a commercial area like downtown Los Angeles, 75-80 dBA would be tolerated. In residential areas, major contributors to outdoor noise are transportation, industry, construction, and human and animal sources. Population density is a primary determinant of ambient noise levels. In addition to outdoor noise, additional exposure of humans to noise results from sources inside homes (e.g., appliances, radio and television, and people and animals) and sources in the workplace, especially from mechanical and electronic equipment.

Noise Standards and Regulations. An average 24-hour level of noise exposure to the human ear of less than 70 dBA (L_{eq}) is generally sufficient to protect against hearing damage.[52] However, to protect various human activities and sensitive land uses (e.g., residences, schools, and hospitals), lower noise levels are needed. For example, an L_{dn} of about 55 to 60 dBA outdoors is necessary for intelligible speech communication inside a typical home. In addition, social surveys and case studies have shown that complaints and community annoyance in residential areas begin in significant amounts at the 55 dBA (L_{dn}) level and rise to substantial amounts at the 65 dBA (L_{dn}) level, giving rise to widespread complaints, individual threats of legal action, etc. On the basis of such information, EPA has identified a range of sound levels sufficient for protection of public health and welfare, shown in Table 12. These levels were not developed as standards or regulations, but to indicate the "levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise."

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[52] US EPA. Protective Noise Levels. EPA-550-9-79-100, 1978.

Table 12
NOISE LEVELS REQUISITE TO PROTECT PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

Area (Effect of Exceedance)	Daily Noise Levels L_{eq}	L_{dn}
1. All areas (Hearing loss)	70	
2. Outdoor residential (Interference and annoyance)		55
3. Outdoor non-residential (Interference and annoyance)	55	
4. Indoor residential (Interference and annoyance)		45
5. Indoor non-residential (Interference and annoyance)	45	

Source: US EPA. The Noise Criteria Document. March 1974.

Table 13
DESIGN NOISE LEVEL/ACTIVITY RELATIONSHIPS

Land Use Category	Design Noise Levels L_{eq}	L_{10}
A. Tracts of land recognized by local elected officials as requiring special qualities of serenity and quiet.	57	60
B. Parks, picnic areas, playgrounds, not in A; residences, hotels, schools, churches, libraries and hospitals.	67	70
C. Developed lands not in A or B.	72	75
D. Interior of residences, hotels, schools, churches, libraries and hospitals.	52	55

Source: US DOT. Highway Noise Control Standards and Procedures. Federal Highway Administration, June 1973.

The U.S. Department of Housing and Urban Development (HUD) sets 65 L_{eq} (approximate) as the upper level for acceptable exterior residential noise for projects funded by HUD, not to be exceeded more than eight hours per day. The Federal Highway Administration (FHWA) has set design goals for federally funded highway projects, shown in Table 13. The American Public Transit Association has proposed guidelines for maximum noise exposure to transit facilities similar to the FHWA and EPA criteria.

At the local and state levels, additional noise regulations and guidelines serve to limit noise emissions or mitigate the effects of noise generation. Cities and counties have their own General Plan Noise Elements mandated by Section 65302 of the State Government Code. These elements describe noise conditions and include planning guidelines for determining land use compatibility with community noise levels. Ordinances to control noise generators in these jurisdictions have typically resulted. The State Vehicle Code (Sections 27200-27207) sets limits for noise emissions from motor vehicles and provides for reductions in noise emission limits for vehicles manufactured after specified dates.

Transportation Noise Sources. Transportation facilities, including streets and highways, railroads, and airports, are among the most important sources of outdoor noise in the SCAG region, with streets and highways constituting the foremost local noise source. Table 14 presents noise levels associated with selected highways in the SCAG region. Key factors which influence noise levels near highways include distances, traffic volume, vehicle mix (e.g., heavy truck traffic results in high noise levels), highway configuration (below, at, or above grade), traffic speed, banked turns, and the presence of noise barriers (such as the sound barrier walls at the San Diego Freeway location as shown in Table 14). For comparison, the noise level (CNEL) associated with a typical railroad mainline is approximately 70 dBA at 100 feet from the track, 65 dBA at 215 feet, and 60 dBA at 420 feet.[53] The CNEL measure is very close to the L_{dn}.

The effects of transportation noise depend on whether various sensitive land uses and corresponding human activities are located near the noise source. For example, projects with similar noise emissions would affect commercial or industrial settings differently than they would rural and urban residential settings. Without adequate noise attenuation, noise levels from major freeways and highways can be significantly higher, at substantial distances, than the ambient levels characteristic of quiet suburban and urban residential neighborhoods. Noise control measures, such as sound walls and use of berms and below-grade designs, reduce the effects of noise on surrounding land uses.

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[53] County of Los Angeles. General Plan Noise Element. 1974.

TABLE 14

NOISE LEVELS AT SELECTED HIGHWAYS IN THE SCAG REGION [a]

Route	Description	ADT [c]	Distance to L_{dn} Contour (feet)[b] 75 dBA	70 dBA	65 dBA	60 dBA
SR-60	Pomona Fwy at Garfield in Montebello; 20' above grade.	167,000	120	350	640	1090
SR-11	Harbor Fwy at 228th, in Carson; 20 feet below grade.	94,000	-	90	170	350
SR-11	Harbor Fwy at 234th, in Carson; at grade.	94,000	70	210	450	780
I-405	San Diego Fwy east of Seal Beach Bl, Seal Beach; at grade:					
a.	without sound barrier wall	203,000	170	400	710	1160
b.	with 18-foot sound wall at 90 feet from outside lane.	203,000	90	90	190	430
SR-57	Orange Fwy at Orangethorpe Ave, in Placentia; 20 feet above grade.	114,000	-	240	500	830
SR-90	Imperial Hwy, at Prospect Av, in Yorba Linda; at grade.	21,000	-	50	170	350

(a) Under state law, responsibility for noise compatibility measurement was transferred from CalTrans to cities and counties; noise contours were last uniformly developed based on 1976 conditions.
(b) Distance measured from outside of outermost lane.
(c) Average daily traffic, 1976.

Source: Caltrans, District 7, Los Angeles, 1976 Noise Contour Map.

The central portion of the Los Angeles Basin must deal with the most noise. Roughly speaking, this area would be bounded by the San Diego Freeway (between the Hollywood and Harbor Freeways) on the west, the Hollywood and San Bernardino Freeways on the north, the San Gabriel Freeway (I-605) on the east, and the San Diego Freeway again on the south. Within this area noise from traffic on freeways often is incompatible with residential uses within 1,500 feet from the roadway centerline on each side, as illustrated in Figure 19.

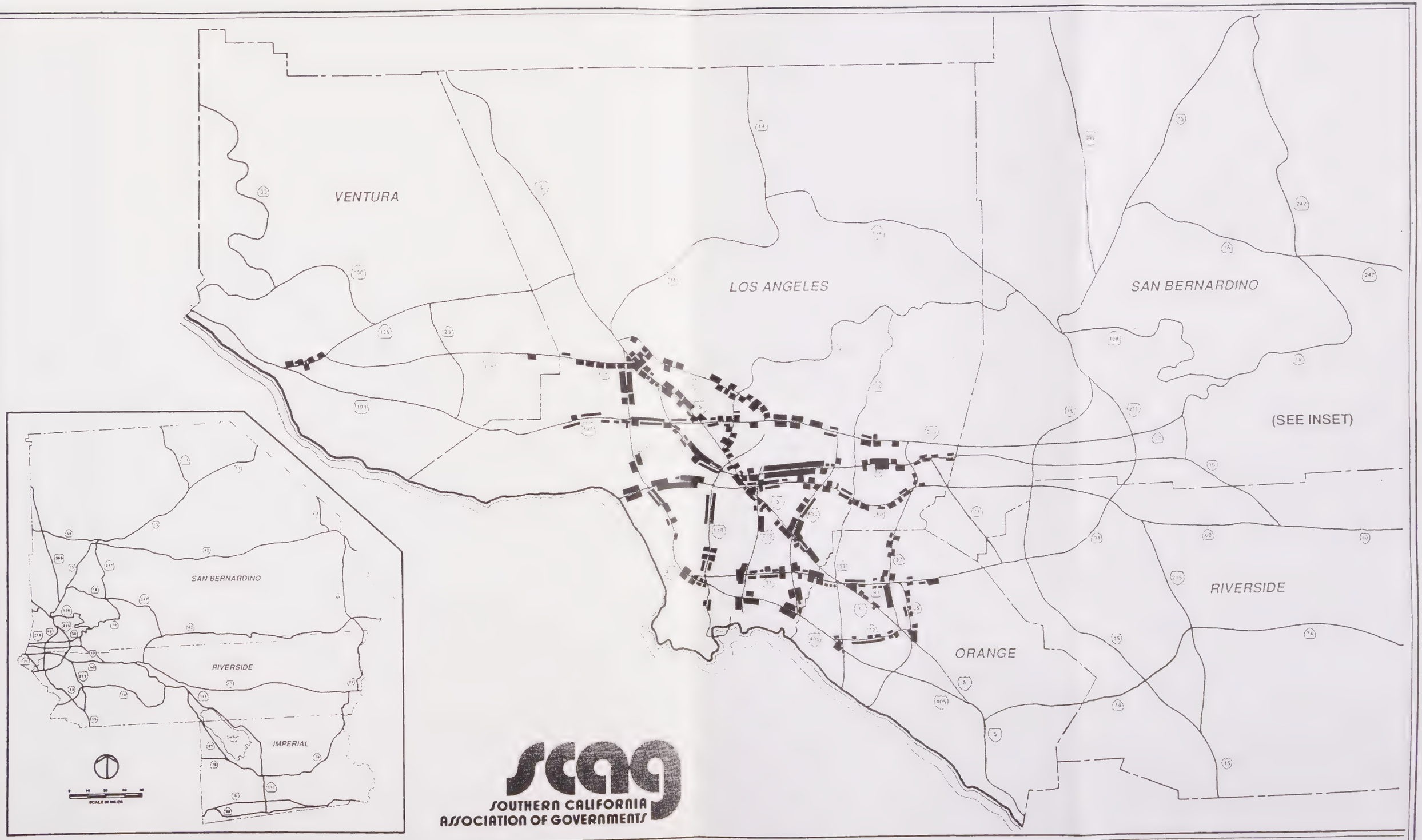
PROJECT IMPACT

The growth assumptions of the 1988 Draft RMP forecast an additional population of over 4.5 million in the SCAG region. Without proper mitigation, the overall impact of such growth on the noise situation would be to further deteriorate it. Growth in employment which would accompany the growth in population would create demands on the transportation system adding to the noise problem. The following sections detail the effects of each RMP element on environmental noise.

Transportation Demand Management. The essence of this element is to mitigate the traffic and associated environmental impacts of growth by actually reducing demand. One of the strategies proposed in the Plan is to spread out working hours so that the demand on the transportation system is also spread out. This would have the effect of pushing more commuting hours into the period before 7:00 am which is considered more sensitive in terms of noise perception. For example, a shift of 20% of AM-peak traffic on a freeway segment with 2,400 vehicle/hour volumes to the period before 7:00 am would increase L_{dn} noise levels by 0.8 dBA, less than the 2 dBA threshold for audibility. Such a change could shift the local 60 dBA noise contour from 250 to 350 feet from the roadway centerline, increasing the band of residential uses potentially exposed to incompatible outdoor noise levels.

New Facilities. Among the new facilities proposed in the plan, four projects would have aerial components: addition of second levels on the Ventura/Hollywood Freeway (US-101) between SR-27 and SR-110 and the Santa Ana Freeway (I-5) between the Downtown Los Angeles the Orange County line, the Harbor Transitway, and the Century Light Rail Transit. All of these pass through already built up areas thereby increasing existing noise levels. Aerial designs result in noise traveling further with less attenuation. Depending on specific designs and local characteristics, an aerial versus at-grade facility can result in a tripling of the distance from the facility of the area of most significant noise impact.

The addition of highway and transit facilities will add to existing noise levels during both construction and operation. The RMP would have a direct impact on noise levels in the region through the following proposed highway and transit projects.



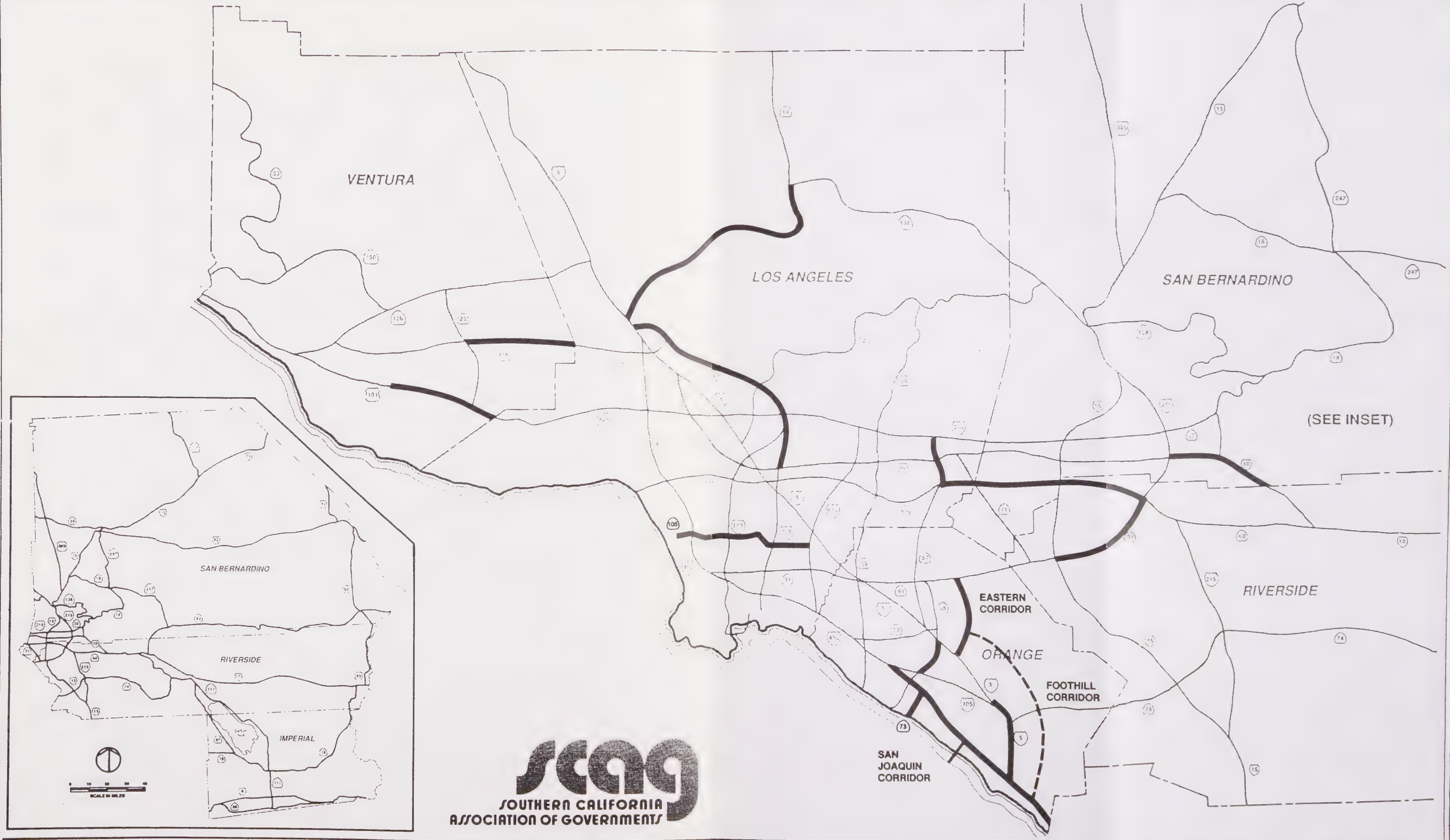
Planning Consultants Research

0 10 20
SCALE IN MILES

LEGEND:
EXISTING (1987)
ELIGIBLE

Source: Planning Consultants Research, based on CALTRANS, 1988.

Figure 19
SOUNDWALLS - CURRENT STATUS



SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Planning Consultants Research

0 10 20
SCALE IN MILES

LEGEND:

POTENTIAL SOUNDWALL LOCATION FOR PLAN NOISE IMPACT MITIGATION

Source: Planning Consultants Research, 1988

Figure 20
SOUNDWALLS - POTENTIAL NEEDS

1. **Highway construction, extensions and connections**

- The Route 7 freeway extension with guideway will cause noise increase in many suburban or relatively undeveloped locations depending on the alignment selected.[54]

- The Route 39 arterial construction project may have adverse effects on Otterbein State Park and residential La Habra Heights.

- The new Century Freeway (I-105) will cause substantial noise level increases at residential locations along much of the route.[55]

- The I-15 freeway connection project (Norco Reach) will cause noise level increases in residential areas along the route.[56]

- The Route 57 freeway extension in Orange County could have adverse noise impacts on a substantial number of residences depending on the alignment ultimately selected.

- The San Joaquin Hills expressway project would impact significantly 29 noise sensitive areas along the corridor (relative to Orange County noise criteria) and 26 sites according to FHWA and Caltrans noise abatement criteria. It would have adverse impacts on the Harborview Knoll residential area and on some proposed residential areas in the Laguna Hills-Laguna Niguel area, as well as disturbing an undeveloped natural area.[57]

- The Eastern and Foothill Corridor arterials would involve the introduction of new noise impact corridors in what are primarily natural, undeveloped areas. These arterials also involve potential adverse effects on residential communities planned for future development.[58] In the Santiago segment, scattered existing residences may experience noise levels greater than 65 CNEL, and portions of O'Neill Park would be subject to levels above 70 CNEL (considered incompatible with park uses).

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[54] FHWA and Caltrans. Long Beach Fwy SR-7: Second Supplemental DEIS. March 1983.

[55] FHWA and Caltrans. El Segundo-Norwalk SR-1/I-105 Transitway: FEIS. July 1977.

[56] FHWA and Caltrans. Norco Reach (I-15): DEIS. 1979.

[57] Orange County EMA. San Joaquin Hills Corridor DEIR. DEIR # 494, June 1988.

[58] OC EMA. Foothill Transportation Corridor DEIR. DEIR #423, 1981.

However the noise levels generated by the corridor are not expected to preclude any land use options. Noise barriers and site design may be necessary to reduce noise levels compatible with some desired land uses.

2. **Transit lines and commuter rail projects**

- The Yorba Linda - Los Angeles CBD and the Los Angeles - Long Beach light rail lines could adversely affect long strips of residential and other sensitive land uses.[59]

- The Redondo Beach to El Segundo light rail could adversely affect residential neighborhoods, primarily in Hermosa Beach and Manhattan Beach.

- The light rail project along Exposition Boulevard would also be expected to adversely affect some residential neighborhoods.

- Wilshire Metro Rail will have locally significant impacts on several residential and other sensitive locations along the route due to ground-borne noise; light rail along Santa Monica Boulevard (SR-2) or westward extension of the Metro Rail project along Wilshire Boulevard would also potentially impact strips of residential development and parkland areas; in addition, rail transit in the Los Angeles CBD could adversely affect some residential hotels and apartments.[60]

- Heavy local controversy continues regarding the San Fernando Valley light rail project's expected noise impacts on adjacent residential land uses.

Local and Regional Impacts. The Federal Highway Administration has established a model for predicting roadway traffic noise impacts on land use compatibility.[61] This model has been adapted to estimate potential impacts of the RMP on noise levels, given volumes, speeds, and vehicle mixes on route segments of freeways in the region. Model results, expressed in distance from the freeway centerline to the 60 dBA noise contour, provide a sense of the

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[59] LACTC. Potential Environmental Issues for Six Alternative Transportation Corridors. Working Paper 10, February 1982.

[60] UMTA and SCRTD. Preliminary Draft Environmental Impact Statement and Environmental Impact Report on Los Angeles MetroRail. March 1983.

[61] US DOT. Highway Traffic Noise Model. Federal Highway Administration, FHWA-RD-77-108, December 1978.

scale of potential mitigation necessary for implementation of plan strategies.

Volumes are projected to go up on quite a few segments of highways. The building of the Century Freeway (I-105) would increase volumes in that corridor by about 13 times. On the Pomona Freeway (SR-60) between SR-57 and SR-91, volumes would go up by up to 1.5 times.

However, the Pacific Coast Highway (SR-1) would see a decrease in overall volumes between Oxnard and the I-5. Other routes where there would be decreases in volumes are SR-19 in Rosemead/Lakewood, SR-34 (Mission Road), SR-39 (Beach Boulevard), SR-42 (Manchester/Imperial) and SR-91 between SR-1 and I-5. This would mean a reduction in noise levels in the areas surrounding those routes if other factors such as speed remain constant.

By the year 2010, under the RMP, increases in volumes would cause the 60 dBA noise contour to jump from below 1,000 to well above 1,000 feet from the freeway centerline on segments along numerous routes in the urban region, as illustrated in Figure 20. Construction of soundwalls may be necessary along sections within these route segments including the following:

- Santa Ana Freeway (I-5) between I-405 and the Orange County line
- San Bernardino Freeway (I-10) between I-215 and SR-71
- San Bernardino Freeway (I-215) between I-15 and SR-60/91
- Long Beach Freeway (I-710) between Valley Blvd. and SR-210
- Antelope Valley Freeway (SR-14) between I-5 and SR-138
- Newport Freeway (SR-55) between I-5 and Bristol St.
- Pomona Freeway (SR-60) between SR-57 and SR-91
- McArthur/San Joaquin Freeway (SR-73) between I-405 and SR-1
- Riverside (SR-91) between Main St. and SR-60
- Ventura Freeway (US-101) between SR-126 and SR-27
- Century Freeway (I-105) between Sepulveda and Norwalk
- Harbor Freeway (SR-110) between I-10 and I-405
- Simi Valley Freeway (SR-118) between SR-210 and SR-23

Neighborhood Traffic Intrusion. It should be noted that the RMP would result in lower volumes than under no-project conditions, as a result of the growth management, demand management, and TSM elements of the RMP. However, the higher volumes without the RMP would be accompanied by lower noise levels and narrower 60 dBA contours around freeways, because of the severe congestion and speeds averaging 19 miles per hour. The congestion would lower speeds so significantly that most existing soundwalls could be done away with and hardly any new ones built. However, freeway congestion would result in greater traffic volumes on arterials and local streets and neighborhood traffic intrusion, accompanied by local traffic noise impacts.

RECOMMENDED MITIGATION

There are many noise attenuation measures that can reduce noise impacts and these are often incorporated directly in the design of transportation facilities. Project-level environmental assessments and project engineering for individual projects in the RMP will need to consider specific mitigation measures to reduce significant impacts. Mitigation measures that would reduce the impacts discussed previously include the following:

- SCAG supports CalTrans in giving highest priority for the sound-barrier program to existing noise sensitive areas.

- Compliance with federal, state, local noise reduction policies, standards, and land use strategies is essential to preventing severe noise impacts.

- Adjustments to the alignments of transportation facilities should be used to allow greater distances from noise-sensitive areas; depressed alignments are an effective means of containing noise; elevated alignments for transit projects, especially rail, should be avoided where feasible.

- Land use measures, such as zoning or restrictions on development rights, can be used to assure the future development of compatible land uses adjacent to transportation facilities.

- Buffers or barriers, such as vegetation, earth berms, and sound barrier walls should be used to reduce noise emissions. It is recommended that soundwalls be constructed in the segments specified above in the Local and Regional Impacts section.

- Where right-of-way design measures are insufficient, use of insulation or noise barriers on adjacent receptor properties should be required for adequate mitigation.

- Technical advances in road and track construction and vehicle design sill aid in reducing transportation noise emissions; choice of less noisy transit technologies should be encouraged.

- Operations restrictions (e.g., of speeds, transit hours of service) should also be employed to reduce adverse noise impacts.

- Construction noise effects should be mitigated by scheduling of construction activities during daytime work hours and providing measures to protect sensitive receptors near individual projects.

4.I. CULTURAL RESOURCES

REGIONAL SETTING

Cultural/Scientific Resources. Cultural and scientific resources include structures or sites of historical, archaeological, and paleontological interest. As such, cultural resources may include buildings, objects, sites, and districts of archaeological, historical and other cultural significance. Scattered throughout Southern California's developed area are significant cultural and scientific resource sites, reflecting both the region's long occupancy from prehistoric times and the semi-arid climate which helped preserve these sites, as indicated in Figure 21.

Human occupation here may have extended beyond 20,000 years to late Pleistocene times. After this initial occupation, Southern California's history has been divided by scholars into four broad time frames: Millingstone Horizon, La Jolla Complex, Encinitas Tradition, and Intermediate Period. Because of the semi-arid climate, the density of both historical and prehistoric sites that have been preserved is relatively higher. The greatest concentration of undiscovered archaeological and paleontological sites probably occurs in currently undeveloped mountain, desert, and coastal areas.

There are more than 13,000 known or surveyed archaeological sites within the SCAG region, approximately three-fourths of which are located in desert portions of Imperial, Riverside, and San Bernardino counties. But, field surveys and reconnaissance sampling efforts are conducted only in limited areas most expected to have such sites or where recent development of vacant land is planned. So the number of sites is dependent upon previous survey activity, possible site density, and the potential for sites to be discovered.

The vast majority of the 930 designated historic sites in the region are located in urbanized areas, primarily in Los Angeles County. Paleontological resources are located throughout the SCAG region in areas of geologic uplift, such as the Santa Monica Mountains, where ancient marine fossils can be found, particularly in exposed canyon areas, streambeds, and along roadcuts.

Archaeological and paleontological resources are frequently uncovered during construction, while historical resources are generally known. Stringent mitigation and protection measures are required whenever new cultural and scientific sites are discovered as result of development activities; in addition, there is a general requirement that a cultural resource survey and impact report be prepared prior to commencement of any action, development, or land use change subject to the California Environmental Quality Act (CEQA), or the National Environmental Protection Act (NEPA) on lands subject to federal jurisdiction or for projects involving federal funding. In addition, historical resources are protected under regulations of the National Historic Preservation Act and the Department of Transportation Act of 1966, which is described below.

VENTURA

LOS ANGELES

SAN BERNARDINO

(SEE INSET)

RIVERSIDE

ORANGE

SAN BERNARDINO

RIVERSIDE

IMPERIAL

SCAG
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

Planning
Consultants
Research

0 10 20
SCALE IN MILES

LEGEND:

- NATIONAL REGISTER ENTRY
- NATIONAL LANDMARK
- STATE LANDMARK
- LOCAL DESIGNATION

Source: California Department of Parks & Recreation, 1973

Figure 21
HISTORIC AND CULTURAL RESOURCES

Section 4(f) Lands. Section 4(f) lands, as defined by the U.S. Department of Transportation (DOT) Transportation Act of 1966, include: public parklands; recreation areas; wildlife and waterfowl refuges; and publicly or privately owned historic properties of federal, state or local significance. The Transportation Act requires a comprehensive evaluation of all environmental impacts resulting from federal-aid transportation projects administered by FHWA, UMTA, and FAA that involve the use of (or interference with use) these lands. This evaluation, referred to as a Section 4(f) statement, must be sufficiently detailed to permit the U.S. Secretary of Transportation to determine that:

- There is no feasible and prudent alternative to the use of such land.
- The program includes all possible planning to minimize harm to any park, recreation area, wildlife and waterfowl refuge, or historic site that would result from the use of such lands.

If there is a feasible and prudent alternative, a proposed project using Section 4(f) lands cannot be approved by the U.S. Secretary of Transportation. If there is no feasible and prudent alternative, the proposed project must include all possible planning to minimize harm to the affected lands.

Detailed inventories of the locations of and likely impacts on resources that fall into the category of 4(f) lands are required in project-level environmental assessments.

PROJECT IMPACT

The strategy adopted by the RMP includes a very heavy focus on transportation demand management, transit development and growth management. As a result, the freeway element is minimal given the level of needs dictated by the growth assumptions. As detailed in Section 4.A. Mobility and Access, the construction of the freeway element of the plan would add 3,097 lane miles of highway facilities and 360 miles of heavy and light-rail lines in urban areas, would potentially directly impact 3,670 acres of land for right-of-way and indirectly affect 21,340 acres through construction.

As cultural and historical resources are integral to physical land resources, the proposed RMP will impact them insofar as its provisions demand construction or some change in use of land. Because many historic resources are existing structures and since many scientific resources are buried under existing built areas, construction that takes place in vacant land areas may not necessarily have a greater potential for impact than that in built areas.

The potential impacts of the RMP on cultural and historical resources would vary depending on whether the highway and transit projects would require construction of new facilities in areas not now used for transportation. Most of the impacts would result from projects involving highway construction,

extension and connection, and transit projects that would be built on new rights-of-way. Other remaining projects proposed in the RMP include highway widening and upgrading projects, transit guideways that would be built along existing roadways, and transit projects that would use existing rail lines. These projects would have minimal impacts on cultural and historic resources.

Potential Significant Impacts. The first group of projects would require clearing, grading, cut and fill and covering over areas that are now either undeveloped or developed with a use other than transportation. These activities would uncover or destroy archaeological and paleontological sites, either known or previously unrecorded. The highway construction projects in this group generally traverse more outlying areas than the transit projects, and are more likely to encounter unrecorded sites, although the potential for sites is known from past research.

- San Joaquin Hills Corridor, Orange County -- Regardless of which of the proposed alignments is chosen, this highway construction project would take 15 archaeological sites either partially or completely. Nine of these have been preliminarily recognized as eligible for nomination to the National Register. Six sites are on the margin of probable effect from grading operations. Impacts to them could be avoided if special concern is given to their location. All of them are also eligible for the National Register. Of the alternative alignments some take more, and some, less sites. The proposed corridor also traverses predicted fossil bearing geologic formations. Construction there may uncover subsurface resources.

- Eastern and Foothill Corridors, Orange County -- This freeway construction project has the potential of impacting 11 archaeological sites. Depending on the alignment chosen, the number may be less. Four historic landmarks and the Serrano adobe are indirectly impacted. The Santiago segment of the freeway directly impacts three known paleontological localities and may indirectly impact seven others. It runs through an area of very high sensitivity near Cook's Corner and Oso Reservoir.

Other highway construction and new transit projects that could uncover significant archaeological and paleontological sites include: the Wilshire MetroRail project, the Pasadena-Glendale-LA CBD Transit, and the I-105 highway and guideway construction.

- Wilshire MetroRail -- has the potential to uncover several archaeological and historic sites in the Los Angeles CBD, including sites in the area of Union Station and the Pueblo de Los Angeles and Zanja No. 8 (a Spanish drainage ditch) in the area of 5th and Hill Streets. There is also very high potential to uncover archaeological and paleontological sites in the area of the La Brea tar pits and Hancock Park.

- I-105 highway and guideway construction -- an archaeologic survey has

disclosed one prehistoric Indian site along this highway's alignment, and there is a potential for other sites to be uncovered during construction.

- Route 55 -- This corridor contains three recorded archaeologic sites. The proposed widening of this corridor could affect these sites as well as significant paleontologic resources.

Historic Resources. Historic resources are found both in the urbanized areas, where new transit projects would be built, and in the outlying areas, where many of the highways construction projects are proposed. These resources consist primarily of sites that are eligible for listing or are listed on the National Register of Historic Places and are protected under NEPA, CEQA, and Section 4(f) of the Department of Transportation Act of 1966, as well as by local ordinances.

Examples of potential impacts of the RMP on historic resources include:

- Route 7 highway and transit projects -- effects on 3 to 6 historic properties/districts, depending on the alignment chosen.

- Wilshire Metro Rail -- will cause minor changes to Union Station, the Title Guarantee Building, and the Pershing Square Building in downtown Los Angeles, but no adverse impacts to 13 other historic buildings along the route.

- Pasadena-Glendale-LA CBD Transit -- could require acquisition of right-of-way at some historic sites.

- I-105 highway and guideway -- there are 10 designated historic sites resources within the study area, but the only potential direct impact would be to the Lynwood Pacific Electric Depot, which is located along the Southern Pacific Transportation Company line within the area of the proposed Long Beach interchange.

- Route 55 construction -- there is a station master's house that is eligible for listing on the National Register of Historic Places.

It is likely that projects would contain sites of local historic significance, which would be protected under local land use regulations.

Parks and Recreational Areas. There is a potential for minor impacts on parks and recreational areas in the SCAG region. Examples of the potential impacts of new highway and transit construction projects include:

- Route 39 -- the extension of this route through land that has been acquired by Los Angeles County for a 550-acre park with a wilderness theme.

- o Wilshire Metro Rail and LA CBD Transit -- the construction of these projects could cause partial view obstruction, acquisition of small amounts of right of way, or other effects on four or five urban park sites and the Santa Monica Mountains National Recreation Area.

- o I-15 Norco Reach -- this extension requires the acquisition of approximately 10 acres of the River Trails Park along the Santa Ana River.

Projects with Lesser Impacts. The impacts of the second group of projects, consisting of highway widening and upgrading projects, guideways that would be built along existing roadways, and transit projects that would use existing rail lines, would be limited because of the limited construction required or limited to existing rights of way.

- o Harbor Freeway Guideway (SR-110) -- this could disturb an archaeologic site under Vermont Avenue near the Pacific Coast Highway (Route 1). Paleontological resources could also be uncovered during construction of the guideway and the upgrading of Route 71 along the Chino Hills.

Three projects that could affect historic resources are:

- o Extension of HOV to Union Station
- o SR-110 Guideway could have visual effects on historic properties.
- o Route 101 widening in Camarillo would require removal of about 650 eucalyptus trees forming the Adolfo Camarillo Grove.

Impacts on parks and recreational areas from this group of projects would need to be assessed in individual studies and in Section 4(f) statements.

RECOMMENDED MITIGATION

Several federal statutes protect historical, paleontological, and archaeologic resources. Among these are the National Environmental Policy Act of 1969, Section 4(f) of the Department of Transportation Act of 1966, and the Antiquities Act of 1906. These resources are also protected under the California Environmental Quality Act of 1970, and various local protective measures. These regulations require that lead agencies mitigate identified adverse impacts to cultural and scientific resources on a project level. Project-specific environmental assessments and Section 4(f) Statements include surveys of project sites, recording and determination of potentially significant sites, and specific mitigation measures to reduce effects on significant resources. In general, actions that would be recommended to reduce the impacts of transportation project on historic, archaeologic, and paleontologic resources include the following:

- o Preservation of historic, archaeologic and paleontologic resources through redesign or relocation of the project, open space easements, or integration of the resource into park land.

- o Relocation of historic resources;

- o Preservation of elements of historic structures scheduled for demolition;

- o Excavation of archaeologic and paleontologic sites by covering them over with fill, asphalt, or some other material to keep their contextual setting; and

- o Salvage of archaeologic and paleontologic sites.

- o Stage II archaeological testing programs would be carried out prior to construction for final determinations of eligibility. Sites determined eligible will be treated accordingly -- they will be subjected to a data recovery program which will include excavation, analysis, prediction measures, reporting, curation of collections, and other steps consistent with federal guidelines.

- o Certified archaeologists and paleontologists would be retained prior to construction at the pre-grading conference to establish procedures for archaeologic surveillance and the preconstruction salvage of exposed resources.

- o Areas of very high and high paleontological sensitivity should be monitored closely during the grading phase;

- o All specimens collected should be donated to the most appropriate educational research institution as dictated by level of scientific significance. Proper housing and curation of fossils are two of the most important elements in mitigating adverse impacts.

Mitigation measures for impacts on parks and recreation areas would be similar to those for cultural and scientific resources; these and measures to reduce impacts on wildlife and water fowl refuges would be specified in project level environmental documents and in Section 4(f) Statements.

4.J. SOCIAL IMPACTS

REGIONAL SETTING

This section examines the social character of the region relative to the regional transportation system. The principal issues raised by mobility improvements with regard to the regional social fabric include the following:

- o communities and neighborhoods
- o special mobility groups
- o personal mobility

Communities And Neighborhoods. Development of the freeway system, which primarily took place in the 1950s and 1960s, had both positive and negative social effects on local communities and neighborhoods.

On the positive side, the freeway system has helped to link and integrate communities in SCAG's vast, low density region. Development of the network has provided residents with expanded temporal and spatial accessibility to all parts of the region, thus enlarging the metropolitan environment and the range of economic, social and cultural opportunities available. Also, development or improvement of particular parts of the system within the more urbanized areas has rejuvenated many communities, such as those located adjacent to the Hollywood, Pasadena, Glendale, Santa Monica and Santa Ana freeways. This development has helped to attract or facilitate economic growth in these communities. Development of the freeway system has also helped remove spatial constraints to the region's development, and has facilitated the growth of suburban communities, while maintaining accessibility to the regional core. Many of the region's freeways helped open up rural and undeveloped lands for the growing population of Los Angeles, and helped define future communities that would develop in their vicinity.

Development of the freeway system has also resulted in negative community impacts. In addition to air, noise and visual impacts (discussed elsewhere in the report), freeways have displaced neighborhoods. Many of the region's early freeways were constructed during the 1950s and 1960s in built-up areas, dividing established neighborhoods, changing community character, and displacing residents and businesses because of the needed right-of-way acquisitions.

All told, it has been estimated that freeway construction in Los Angeles, Orange and Ventura counties displaced about 1/4 million people from their homes.[62] This phenomenon occurred partly because until 1965, state law required freeways to take the most direct and practical route--a directive that did not always encourage sensitivity to more subtle community values. Also, to keep right-of-way expenses down, freeways were routed through

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[62] Brodsley, D. LA Freeway. UC Press, 1981.

inexpensive property, with the result that a disproportionate number of those affected by relocation or disruption were poor, minority or elderly. Examples of this are East Los Angeles (intersection of six urban freeways); Norwalk (I-605--San Gabriel Freeway); and Watts (I-110--Harbor Freeway). Associated with residential displacement was the reduction of housing stock, particularly low income housing.

During the mid-sixties, transportation planners began considering routes and alignments that minimized residential disruption and displacement, This was greatly due to citizen reaction to previous projects. The Uniform Relocation and Real Property Acquisition Policies Act was also enacted in 1970 which provided certain remedies for federally assisted transportation projects that involved unavoidable residential displacement. The remedies include "uniform and equitable land acquisition policies and relocation assistance of displaced persons..." A similar provision was enacted at the state level.

Most freeway construction which took place during the 1970s did not involve widespread residential displacement or community disruption, since construction largely consisted of gap completions and new freeway development in growing areas of the region. One notable exception was the right-of-way acquisition that began in the 1970s for eventual construction of the 17 mile Century Freeway (I-105). Although the right-of-way traverses fully developed and predominately low/moderate income residential communities, the freeway is considered essential to the region's transportation system. When all right-of-way acquisition is completed, it is estimated that about 26,000 residents will have been displaced.[63] Most of the acquisitions and displacements for the freeway occurred in the 1970s; residents were then given only financial relief for relocation, and assistance in finding comparable replacement housing.

For residents who remain in yet-to-be purchased right-of-way, the California Housing and Community Development Department, acting under a 1981 U.S. District Court Consent Decree, is required to make 4,000 units of housing available to displacees, either through rehabilitated or new replacement housing. This program of creating additional housing supply is a unique precedent for highway projects, and was spurred by shortages in housing stock in the region.

Special Transit-Dependent Groups. The extent to which the region's transportation system affords mobility and accessibility to special segments of the region's population, such as the elderly, the transportation handicapped, and low income persons is important. These groups are a large component of the region's population, and often have special transportation needs. In 1980, nearly 1.1 million people in the region (10%) were elderly (65 years and over), and 304,000 persons (2.5%) were transportation

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[63] California Department of Housing and Community Development. Century Freeway Housing Program. August 1982.

handicapped.[64] In addition, the number of low-income persons in the region totalled 3.9 million, or 34% of the total population.

Many of the region's elderly are retired, live on fixed incomes, do without cars, and depend on public transportation, as do many low income people. Although a large number of handicapped persons find public transportation services difficult to use, many must, nonetheless, depend on these services. During the past 10 years, transportation policy at all levels has incorporated special provisions for reducing transportation deficiencies which affect the elderly and transportation handicapped. Greater attention has been directed toward increased provision of special transit facilities and services, and reduction of access barriers to public transportation facilities and vehicles. Attention has also been paid to making automobile travel, pedestrian facilities, rail services and airport facilities more usable to the elderly and transportation handicapped through removal of physical barriers to their use. The following discusses the efforts made in public and private transit to better serve the elderly, transportation handicapped, and low income.

Public Transit Service. In general, public transit in the SCAG region consists of fixed route bus service. Fixed route bus systems have become more "accessible" for use by the handicapped, due in large part to several federal/state regulations requiring improvements to make buses more accessible. Improvements have included equipping bus coaches with lifts or ramps to allow wheelchair use. As of July 1982, peak hour bus fleets in the region were 50 to 100% lift-equipped compared to 8% in FY1978.[65] Additionally, reduced fares have become nearly universal for handicapped persons, and senior citizens using public mass transit.

In addition to facility improvements and reduced fares for the elderly and transportation handicapped, levels of bus service provided in the region are generally responsive to the distribution of travel demand and population. High levels of bus service generally exist in highly populated low income areas, and areas with high concentrations of elderly persons.

Transit and municipal operators have increased their provision of specialized paratransit services, which is described in the following section. Many of these services are directed specifically toward the elderly and transportation handicapped. In FY 1982, 5.8% of all public transit revenue miles were devoted to paratransit services. Many municipalities use some of their local return funds from the Proposition-A half-cent sales tax for transit in Los Angeles County to expand or establish new paratransit services.

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[64] The 1980 Census defines transportation handicapped as persons with public transportation disabilities, including health conditions which make it difficult or impossible for individuals to use buses, trains, subways or other forms of public transportation.

[65] SCAG. Bus Accessibility in the SCAG Region. Working Paper, 1982.

Private Transit Service. Perhaps the biggest response to serving the special transportation needs of the elderly and transportation handicapped (as well as other groups) has come from provision of paratransit services by private operators/providers. Paratransit is generally demand-responsive, rather than having fixed routes. Paratransit vehicles carry smaller numbers of passengers, operate with flexible schedules and routes, and often offer door-to-door service. From this standpoint, paratransit eliminates for the elderly and transportation handicapped many of the barriers associated with fixed-route bus service, such as fixed bus stop locations, inflexible bus scheduling, and inflexible routes. Common paratransit vehicles include vans, large and small buses, jitneys, automobiles and taxis.

An issue that complicates provision of service to the handicapped community is the community's split opinion on "door-to-door" service and "mainstreaming". Advocates for "mainstreaming" desire full accessibility to all modes, and do not want to be separated from the "mainstream" society. This concept has resulted in hugh investment in lift equipment by fixed-route operators. Although most fixed-route operators have achieved 50-100% peak fleet accessibility, handicapped ridership has been disappointingly low. Far greater handicapped ridership has been recorded by paratransit operators.

More than 1,000 agencies are estimated to provide (or purchase) paratransit services in the region, with providers being either multi-service, or transport-only providers.[66] Multi-service providers are mainly social service/human resource agencies (alcoholism and drug abuse centers, churches, counseling, education and training centers, health organizations, medical, nutrition, welfare, senior citizen organizations). Transport-only providers include taxi companies, charter bus companies, and municipal dial-a-ride agencies. Many paratransit services are exclusively oriented toward the elderly, the transportation handicapped, and low income groups. Most multi-service providers do not charge fares, relying heavily on federal, state and local subsidies, or on donations, group charities, and general budgets. Most transport-only providers rely on state, federal and local subsidies, and/or fares.

Despite the myriad paratransit services in the region, it is generally recognized that the services are insufficient to meet demand, and are in need of increased coordination and efficiency. The Los Angeles County Transportation Commission estimates that county paratransit ridership in 1980 was 17,400 to 25,000 trips per day, while estimated paratransit needs greatly exceeded that amount.[67] Another indication of transit needs is expressed through the annual TDA Unmet Transit Needs Hearings, which usually draw heavy

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[66] SCAG. From Here to There: Elderly and Handicapped Transportation Plan. Draft, April 1979.

[67] LACTC. Los Angeles County Social Services Paratransit: Action Plan. Prepared by Carter-Goble Associates, March 1982

attendance by the elderly and handicapped. Finally, it is widely recognized that paratransit service could be improved greatly through increased coordination/consolidation among providers. To this end, the California Social Service Transportation Improvement Act of 1979 (AB 120) was passed. The Act requires each county to inventory its social paratransit services and develop action plans for consolidating/coordinating these services in order to provide for productive and cost-efficient use of services and funds.

In October 1982, UMTA promulgated a Statement of Paratransit policy, which applies to use of funds available under the Urban Mass Transportation Act of 1964. The policy encourages local coordination between public/private paratransit and conventional transit services for increased effectiveness and efficiency of transportation services.

Personal Mobility. In 1984 the highway network in the region carried a total of 40.2 million person trips daily of which 7.3 million trips were home-to-work trips. Intra-county trips, those which begin and end within the same county, currently make up the greatest proportion of total daily person trips and home-to-work person trips.

Drivers in the region traveled more than 220 million miles, primarily on the freeways and arterial roadways, and spent 6.3 million hours traveling. 60% of this travel did not occur during the morning and evening periods of congestion, but travelers during the peak periods experienced the most significant amounts of delay. Region-wide, the AM peak (6:30 - 8:30) accounts for 13.4 percent of the daily miles traveled while the PM peak, (3:00 -6:00) accounts for 27.4%.

In 1984 morning peak periods (considered 6:30-8:30 am), some 400 miles of the freeway system in the region operated at a level of service "F", (LOS F indicates a volume to capacity ratio greater than 1.00, where backups restrict or prevent movement of vehicles, especially interchanges and intersections, with tremendous delays and continuously increasing queue lengths), while during the evening peak (3:00-6:00 pm), 850 miles operated at LOS F. The miles of congestion are concentrated on the freeways and arterials, paralyzing commuters, goods movement, and other trip-makers alike.

The daily costs of recurrent personal and business-trip congestion in 1984 were slightly over $7 million. This cost each person $91 a year to undertake their trips.

The transit facilities network included a total of 483 lines in 1984. The number of trips (849,000) was the total number of boardings, including each transfers a separate trip. Forty-six percent of the express riders were able to walk to their destinations at the end of the trip, while most of the remaining passengers transferred to a local bus to complete the home-to-work trip. The low income and elderly represent a large proportion of transit ridership.

PROJECT IMPACT

The introduction of new and improved transportation facilities in the region will have both positive and negative social effects on the region's communities and individuals. Other sections of this report discuss the air, noise and visual impacts that the RMP system of transportation improvements could have on communities located in proximity to those improvements. This section discusses other social effects of the plan, including the following:

- o community disruption and displacement
- o changes in community character
- o community revitalization effects
- o personal mobility and accessibility effects
- o transportation opportunities for special groups such as the elderly, the handicapped and low-income households.

Displacement of People, Residences and Business. The RMP minimizes the construction of new highways as opposed to a previous RTP strategies which emphasizes the construction of facilities. The job/housing component and the demand management component of the plan focus upon the behavior of people. The consequence of the RMP is that people's travel behavior is modified.

Few of the highway and transit projects in the RMP are likely to require significant displacement of people, residences and businesses. In the case of highways, most of the projects involving widening upgrading and realignment of existing facilities already have protected rights-of-way within which to carry out the improvements, or they are located in areas where needed right-of-way is vacant or undeveloped. Likewise, most of the transit projects involving new facility construction would result in little or no displacement of people or businesses, due to reserved rights-of-way, or the availability of vacant or undeveloped private right-of-way. In many cases these projects have been under consideration for many years, and local land use planning has taken their eventual construction into account.

However, there are some highway projects in the RMP that could involve displacement. The construction of new highway facilities could affect 12,800 acres (within 100 feet of highway construction), 13,300 dwelling units and 33,400 residents.

- o I-105 (Century Freeway) -- In the 1977 FEIS on this new 17 mile freeway that will traverse a highly urbanized area, it was estimated that 25,000 people and nearly 300 businesses would need to be displaced. Most of the right-of-way acquisition, displacement and resulting relocation has already occurred, but some residents still remain to be relocated. Right-of-way acquisition has resulted in major loss of low-income housing stock in the project area, part of which is being remedied by the provision of 3,700 units of rehabilitated or new replacement housing

in alternative locations. The protracted time between right-of-way designation, acquisition and construction in the Century Freeway Corridor has led to some neighborhood social and physical deterioration due to neglected maintenance, early move-outs, loss of neighbors and facilities, etc.

- Route 7 (Long Beach Freeway) -- The two basic alignments being studied for this extension are estimated to result in displacement of between 2,500 and 3,000 residents (many of them low income), primarily in El Sereno, South Pasadena and Pasadena, and displacement of 12-31 businesses, employing 192-378 employees.[68]

- I-5 (Santa Ana Freeway) Widening (LACL to I-405) -- According to the Stage-I Santa Ana Transportation Corridor Study, some new right-of-way would be required for widening of I-5 in this highly urbanized area, potentially displacing 10-11 acres of residential use, and 93-149 acres of commercial use.[69]

- Route 39 (Beach Boulevard) -- The ongoing corridor study for upgrading Route 39 to an expressway could conclude some displacement impacts in this urbanized area.[70]

- Route 55 (Newport Blvd.) Expressway (Rte. 1 to Rte.73) -- Depending on the selected alternative, this expressway could displace a maximum of 1100 people, 607 housing units and 150 local businesses.[71]

- Route 57 (Orange Freeway) -- Extension of this facility from I-5 to I-405 could cause some displacement, depending on the selected alignment, because the area is highly urbanized.

- Foothill and Eastern Corridors -- Although these two arterials in southeast Orange County would primarily traverse unincorporated areas with extensive open space/agriculture, they could cause minor displacement that is now planned in specific locations.

- San Joaquin Expressway -- Although this new facility would traverse mainly undeveloped areas, displacement effects could occur to the east where it would connect to the I-405.

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[68] FHWA and Caltrans. Long Beach Freeway SR-7 Second Supplemental DEIS. March 1983.

[69] OCTC and OCTD. Santa Ana Transportation Corridor Alternatives Analysis. Detailed Evaluation, 1981.

[70] OCTC. Multimodal Transportation Study Draft EA. Prepared by PBQD, October 1979.

[71] FHWA and Caltrans. Route 55 DEIS. March 1983.

Taken together, the combined local displacement effects represented by these various projects is considered regionally significant, but less substantial than in past decades and the currently adopted RTP, when more extensive physical development of the regional highway system occurred.

For selected transit projects, construction of stations and parking lots could also result in minor displacement of some residences and commercial establishments.

Community Disruption. Construction of the many transportation facilities in the RMP will likely disrupt normal activities of neighboring communities because of traffic reroutings, traffic congestion, restricted access to nearby businesses, restricted parking, interference with pedestrian and vehicular circulation, visual unsightliness, and dust, noise and fumes generated by construction equipment. These impacts are generally temporary and short-term, but for some projects the construction phase may last several months or years leading to extended "short-term" disruption of communities. Construction of major freeway, highway and arterial projects in heavily urbanized areas is likely to have the most disruptive impacts on communities. Rail transit projects developed on existing railroad rights-of-way are likely to have the least disruptive construction impacts, while potential rail construction on heavily used surface streets could have highly disruptive community impacts.

The cumulative disruption impacts associated with construction of the various RMP projects are considered regionally significant, even though the projects will be constructed at different times and in many different locations in the region. They are considered regionally significant because of the number of communities potentially disrupted. However, comparatively speaking, the scale of disruption will be substantially less than in past decades when more extensive physical development of the regional transportation system occurred.

Certain transportation facilities in the RMP may cause local community disruption impacts, despite offering increased accessibility to community residents. For example, the development of some new highway facilities in highly urbanized areas could act as physical barriers to social interaction and physical movement among people in surrounding communities.

Besides barrier effects, many of the potential light rail projects identified in the RMP could disrupt local communities by interfering with local traffic patterns and causing local traffic delays. This would be true to the extent that these facilities are located on railroad rights-of-way that are not grade-separated from other cross-traffic, or located on surface streets along with other vehicles.

In addition, some communities may view new or expanded facilities as bringing undesirable amounts of "through" traffic and congestion directly through their communities. Another potential community impact is increased

vehicle (auto and feeder bus) volumes and congestion on streets leading to the various transit stations and parking lots that will be needed to support many of the fixed guideway transit facilities in the RMP. In contrast, some communities may view certain new facilities, particularly new highways, as a positive step toward decreasing traffic congestion on local arterials and streets within their communities.

New transportation facilities will also contribute to a physical change in the general character and ambiance of many communities, particularly those being constructed in undeveloped or developing areas. However, these facilities generally will be built in response to existing or anticipated population growth that in itself is expected to greatly change the overall character of the area.

Under the RMP shorter commutes would be possible for some residents and this could increase opportunities for business involvement in civic issues and projects. In addition shortened home-work trip times increase parenting opportunities as well as increases leisure time. There would also be a reduction in stress associated with lengthy commutes. Changes in community character are not necessarily a disruptive nor an adverse impact; many community residents may view these changes as desirable. On the other hand, many residents may view these changes as destroying the present ambiance of their communities. Increased transit in the region will also change people's lifestyles, by reducing their dependence on the automobile.

Community Revitalization. Some transportation improvements in the RMP may be expected to spur community revitalization in older urban areas of the region by attracting new economic activity and employment opportunities, and perhaps also by attracting new residents desiring to live close to the transportation facilities.

These improvements may promote the dispersion of commercial and social facilities closer to residential areas. Higher parking costs in the CBD or other central areas could also result in increased retail activities in residential areas. As a result of shorter home-work trip times residents would have more time to utilize the facilities available in the community. The demand management component of the RMP could promote demand for service-oriented facilities closer to residential areas for at home workers and/or extended hours of service for flextime or staggered schedules.

As a component of demand management, modified work-weeks (4/40 and 9/80 schedules) encourage changes in work habits including the following:

- job sharing,
- reliance on telecommuting,
- transit use and carpools, and
- increased worker productivity.

Some businesses perceive this component to have potential negative impacts on business administration and communication among workers. Although

initially requiring adjustments to new schedules, flextime and staggered schedules can allow for improved time management and increased social contact outside of work.

A shift in the normal work week would also alter the use of commercial and recreational facilities. In addition demand management financing mechanisms (parking costs and tolls) could reduce non-work trips.

Personal Effects on Mobility and Accessibility. The effects of the RMP on personal mobility and accessibility are expected to be positive because the RMP is designed to meet the travel needs of the present and future population; these effects are discussed in detail in the Mobility and Access Section 4.A.

In terms of the highway travel, personal mobility of highway users will increase to the extent that the various highway and TSM recommendations reduce highway congestion and travel times, or at least maintain them at today's levels. Also, highway actions involving improvement of existing roadways to provide safe, efficient travel will improve mobility.

In rapidly urbanizing areas of the region, there is the greatest opportunity for successful TDM. The use of carpooling as a strategy would reduce congestion and enhanced mobility. At the same time there could occur an additional reduction in commuter use of local streets (reduced trips) as a result of the demand management component of the RMP. The reduced construction involved in the RMP diminishes the short-term negative impact of delay on the roads unlike a facilities-intensive strategy which focuses on building our way out of mobility problems. The job/housing balance component of the RMP has the potential for increased commercial traffic on arterials and in residential areas. The RMP TDM element would demand drastic changes in work schedules. Only 20% of the working population would be able to maintain current work schedules: 20% would telecommute (work at home) full-time, 40% would work 4/40 work schedules, and 20% would work 9/80 work schedules.

In terms of transit, the RMP identifies extensive corridors for development of transit guideway facilities. Individuals living near transit stations and bus routes that connect directly with stations will probably experience the greatest mobility/accessibility benefits. In addition, expanded mobility will be available if there are improved provisions for rider transfer between various transit systems, and increased intersystem schedule coordination allowing users to cross service area boundaries and make modal changes to access their destinations. In terms of local bus service, the mobility of residents using this mode will be degraded unless bus fleets can be expanded to meet levels sufficient to accommodate anticipated population growth.

Transit guideway development will provide additional options of travel for the elderly, the handicapped and the low income who are more dependent on transit for their mobility needs than the remainder of the population. Many of the transit facilities identified in the RMP will pass by areas with high

concentrations of elderly and low income, thus improving their mobility. As for the handicapped, their mobility will probably be only minimally improved with increased availability of transit guideways and most improved if there is continued expansion of paratransit services.

With an increase in transit facilities under the RMP, it is envisaged that commuter costs would increase. These increased costs will be borne mainly by those who do not own vehicles. This group is generally the elderly, the handicapped and the low income. In 1984, there were 531,471 people (7.1%) who did not own vehicles in the SCAG urban region, and it is estimated that by the year 2010 that number would be 762,147 (7.3%). The small regional increase would be accompanied by pockets of higher local increases, especially in Riverside and San Bernardino Counties, where lower-income households will follow lower housing costs. Provision of public transit service to these local transit dependent groups in the outlying counties will be a challenge posed by growth.

RECOMMENDED MITIGATION

Various measures should be employed at the project-level within the various transportation corridors to minimize adverse community impacts. These include:

Community Displacement

- Select route alignments, locations for support facilities, and design features that minimize displacement of residences and businesses. Route alignments for transit guideways should strongly consider use of existing transportation rights-of-way, such as highways and railways, in order to avoid or minimize displacement. Design features should consider use of depressed, elevated or underground facilities, and reduction in widths of new right-of-way where significant displacement is a possibility.

- Where displacement is unavoidable, relocate displacees in accordance with state and federal laws (Uniform Relocation and Real Property Acquisition Policies Act), which provide for monetary compensation for acquired properties, moving expense payments, supplemental payments for replacement housing (or rentals), and relocation assistance.

- Avoid protracted waiting periods between right-of-way designation, property taking and construction, in order to minimize potential neighborhood deterioration due to neglected maintenance, early move-outs, vandalism and value losses.

- Provide housing adequate to meet potential housing shortages created by right-of-way acquisition by providing new or

rehabilitated housing, or relocation of housing from acquired right-of-way.

Community Disruption

- Use construction techniques that minimize disruptive effects of facility construction.

- Select route alignments and design features that minimize barrier effects within communities. Use street and pedestrian over an underpasses where possible to avoid broken linkages in local access. Minimize at-grade crossings of transit facilities and other local traffic, and/or utilize transportation engineering measures to minimize traffic delays. Use existing physical barriers such as highways and railways for future facility development to the extent possible.

- Through the general plan, zoning and subdivision process seek to achieve a satisfactory relationship between transportation development, and current and future development plans. Maximize redevelopment opportunities resulting from new facilities.

- Minimize increased congestion from autos and buses accessing transit stations, centers and parking lots through proper location and design of facilities, and traffic engineering.

Accessibility/Mobility

- Maximize connectivity between transportation service area boundaries and different modal systems through intermodal transfers and intersystem schedule coordination.

- Establish transit fare structures that encourage use of new transit facilities by the elderly and handicapped.

- Use vehicle and station design measures that assure maximum use of transit guideway facilities by the handicapped.

- Continue expansion of paratransit services and local bus service in conjunction with transit guideway development to provide maximum service to the elderly and handicapped.

4.K. URBAN FORM AND GROWTH

REGIONAL SETTING

The six-county SCAG region covers about 38,500 square miles, comparable in size to the state of Ohio and populated by 11.5 million people in 1980; by 1988, the region has grown to 13.7 million residents. While the urbanized portion of the region is vast in its own right, it covers less then 5% of the entire region. As of 1979, there existed enough vacant land suitable for development in the region to rebuild the current urbanized area more than four times.

The depiction of the urban portion of the region as new, sprawling, and lacking features which create a sense of community identity is becoming less pertinent as the Southern California region evolves more like older metropolitan areas and they become more like Los Angeles in terms of the patterns of land use, housing densities, journey to work, and community identification. However, since this region's growth tends to be of more recent vintage and compressed into a shorter time period than is typical, its pattern of land development reflects the more recent experience and later trends. These trends have included the increasing importance of the auto in urban travel; (until recently) dominance of single-family home development; dispersal or decentralization of economic activities; growing affluence; and expanding planned development rather than piecemeal urban land conversion.

In the first quarter of this century, the SCAG region experienced rapid population growth and urban development. This growth occurred primarily adjacent to the expansive Pacific Electric Interurban Railway System, much of which was built in the second half of the 1800s. By observing development patterns since the 1920s, it is clear that the basic urban form of the region since that time was significantly influenced by this network. However, following the mid-20s initial development of what was to be the regional highway network began, and by 1940, the Pacific Electric system was in decline. By 1940, highway development was underway, but it had still not yet significantly affected the region's urban form (perhaps with the exception of the San Fernando Valley, served by the Hollywood Freeway). Urban development at this time was characterized by numerous low-density residential/commercial centers throughout the region, interspersed with areas of even lower density residential infill.

Between 1950 and 1960, the freeway expansion program became quite aggressive, with individual highways coalescing into a regional highway network which supported further infill between the existing urban centers. It wasn't until this period that potential existed for the region to experience substantial new outward growth, growth which was not defined by the earlier Pacific Electric network. Since the period from 1950-1960, further moderate-density residential infill and the intensification of numerous urban centers throughout the region has occurred.

Today, the resulting regional urban form is dependent upon a regional transportation network to provide interconnections between places of employment and business, residence, recreation, etc. The regional transportation system is a vital link in the movement of the region's 13.7 million residents. The region's development has fostered growth of numerous centers surrounded by moderate density residential units.

Regional Subareas. While great differences exist within the bounds of the region, it is possible to divide the region into three subareas, each of which has its own characteristics. These subareas have been named according to their predominant urban/nonurban characteristics: Urban, Urbanizing, and Mountain/Desert.

Urban Subregions. The built-up portion of the city of Los Angeles forms the urban focus of this subarea due to its centrality, population size and density, and concentration of economic activities. This subarea encompasses most of the land between the Pacific Ocean on the west, the Puente/Chino Hills to the east, the Santa Monica Mountains to the north, the Santa Ana River in Orange County to the south, and also includes the San Fernando Valley area. With approximately 1,100 square miles of land in use by urban activities in 1979, this subarea contained about two-thirds of the SCAG areas's total urban land. Roughly three-fourths of the total land area and nearly all of the developable land in this subarea is in urban use. Most of the region's population (71%) and employees (79%) currently live and work in this subarea. The most densely populated area within this subarea is Central Los Angeles, where densities are more than 50 percent greater than the regional average.

The greatest number of miles of highway facilities exist within this area, serving the concentrations of population and employment.

Urbanizing Subregions. This subarea surrounds the Urban Subarea, and is composed of areas where urbanization of largely vacant lands is still underway. The Urbanizing Subarea extends eastward from the Urban Subarea and is bound on the north by the San Gabriel Mountains, on the east by the San Bernardino Mountains, and on the south by Imperial County; it also extends to the north and west, encompassing the Oxnard Plain and the Upper Santa Clarita River Basin. These urbanizing areas are characterized by low to moderate-density residential development; service industries; light, clean industrial development (often in industrial park settings); and land-intensive commercial/industrial developments. Much of this new development is in the form of planned development projects.

In 1979, about a third of the region's total urban land was located in this subarea. However, a great deal of developable land remained vacant or in agricultural use here - over 1,400 square miles. This is nearly ten times the amount which was available in the Urban Subarea. Over one-fifth of the regional population currently lives in this subarea, while less than one-fifth of the employees work here. The most urbanized portions of this subarea are currently served by highway facilities, but large areas of low-density development remain unserved. Most of the highway network in this subarea was

built in the last 10 to 20 years, in contrast to the Urban Subarea where the network was begun over 40 years ago.

Mountain and Desert Subregions. This is a vast area of desert and semi-desert, largely devoid of agriculture and urban development, and as much as six times the combined areas of the Urban and Urbanizing Subareas. Development in this area is characterized by small communities of relatively low-density residential and commercial development. Agricultural production does exist in the Coachella and Imperial Valleys where most local communities are recreation or retirement oriented, as in Palm Springs, Big Bear, etc., or they are dependent on military, industrial, utility or mining operations (Palmdale, Barstow, Boron, etc.). This subregion contained only about 200 square miles of land used for urban activities in 1979; this is only about one-tenth of the region's total urban land area. The majority of this urban development is located in several centers in the Antelope, Coachella and Imperial Valleys. As much as eighty percent of the region's land available for development is found in this subarea. Only about six percent of the total regional population and three percent of regional employment live and work in the Mountain and Desert Subregions. Relatively few highways serve the these areas, but most urbanization is found along the existing facilities.

Job/Housing Balance. Achievement of better job/housing balance within subregional areas is a goal for the region. Job/housing balance is viewed as a positive goal since it reduces the need for long distance commuting, which in turn relieves highway congestion, reduces energy consumption and reduces air emissions. SCAG has ranked each of the 24 subregions within the SCAG region according to their degree of balance between jobs and housing; for the explanatory purposes of this EIR, the subregions have been grouped into three categories: (1) balanced subregions - subregions with an employment to housing ratio between 1.0 and 1.4; (2) housing-rich subregions - those subregions with an employment to housing ratio under 1.0; and (3) job-rich subregions - subregions with an employment to housing ratio over 1.4.

In 1984, the regional job/housing ratio was 1.27 (5,923,000 jobs / 4,648,300 occupied dwelling units). Based on the above criteria, 6 subregions were balanced, 3 were job-rich, and the remaining 15 were housing-rich in 1984, as illustrated in Figure 22.

PROJECT IMPACT

The SCAG region will be home to some 18,256,300 residents by 2010, with 7,317,500 occupied dwelling units and about 8,954,100 employees. The demand for transportation facilities created by this growth was detailed in the needs analysis of the Project Description section of this EIR. In short, the needs defined by year-2010 growth formed the basis for the RMP action elements. A primary element of the RMP is incorporation of and feedback to the 1988 Growth Management Plan. The Growth Management Plan has formed the basis for the RMP, and the RMP has contributed to the Growth Management Plan.

VENTURA

LOS ANGELES

SAN BERNARDINO

(SEE INSET)

RIVERSIDE

ORANGE

SAN BERNARDINO

RIVERSIDE

IMPERIAL

SCALE IN MILES

SCAG
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

Planning
Consultants
Research

0 10 20
SCALE IN MILES

LEGEND:

SUBREGION BOUNDARY

COUNTY BOUNDARY

JOB-RICH

BALANCED

HOUSING-RICH

MOUNTAIN AND DESERT

Source: SCAG, 1988.

Figure 22
JOB HOUSING BALANCE: 1984

VENTURA

LOS ANGELES

SAN BERNARDINO

(SEE INSET)

RIVERSIDE

ORANGE

SAN BERNARDINO

RIVERSIDE

IMPERIAL

SCALE IN MILES

scag
SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS

Planning
Consultants
Research

0 10 20
SCALE IN MILES

LEGEND:
- SUBREGION BOUNDARY
- COUNTY BOUNDARY
- JOB-RICH
- BALANCED
- HOUSING-RICH
- MOUNTAIN AND DESERT

Source: SCAG, 1988.

Figure 23
JOB-HOUSING BALANCE:
YEAR 2010 GMA4MJH

Table 15
GROWTH MANAGEMENT PLAN PROGRAM

County	------Population (1,000)------ 1984 Base	1988 Exist	2010[a] GMA-1	2010[b] GMA-4MJH	-------Population Share------- 1984 Base	1988 Exist	2010[a] GMA-1	2010[b] GMA-4MJH
Los Angeles	7,863	8,556	9,949	10,231	63.5%	62.3%	54.5%	56.0%
Orange	2,067	2,239	3,050	2,982	16.7%	16.3%	16.7%	16.3%
Riverside	758	946	1,969	1,808	6.1%	6.9%	10.8%	9.9%
San Bernardino	1,014	1,240	2,218	2,179	8.2%	9.0%	12.2%	11.9%
Ventura	580	637	910	915	4.7%	4.6%	5.0%	5.0%
Imperial	102	111	160	140	0.8%	0.8%	0.9%	0.8%
						---Growth over 1984---		
SCAG Region	12,383	13,729	18,256	18,256	--	10.9%	47.4%	47.4%

County	------Housing (1,000)------ 1984 Base	1988 Exist	2010[a] GMA-1	2010[b] GMA-4MJH	-------Housing Share------- 1984 Base	1988 Exist	2010[a] GMA-1	2010[b] GMA-4MJH
Los Angeles	2,924	3,083	3,835	3,959	62.9%	60.7%	52.4%	54.1%
Orange	760	829	1,224	1,192	16.4%	16.3%	16.7%	16.3%
Riverside	326	410	892	809	7.0%	8.1%	12.2%	11.1%
San Bernardino	409	504	970	973	8.8%	9.9%	13.3%	13.3%
Ventura	197	218	336	332	4.2%	4.3%	4.6%	4.5%
Imperial	33	36	59	52	0.7%	0.7%	0.8%	0.7%
						---Growth over 1984---		
SCAG Region	4,648	5,080	7,317	7,318	--	9.3%	57.4%	57.4%

County	------Employment (1,000)------ 1980 Census	1984 Base	2010[a] GMA-1	2010[b] GMA-4MJH	-------Employment Share------- 1980 Census	1984 Base	2010[a] GMA-1	2010[b] GMA-4MJH
Los Angeles	3,940	4,053	5,524	5,415	70.6%	68.4%	61.7%	60.5%
Orange	915	1,048	1,920	1,692	16.4%	17.7%	21.4%	18.9%
Riverside	215	247	466	627	3.8%	4.2%	5.2%	7.0%
San Bernardino	285	325	640	789	5.1%	5.5%	7.1%	8.8%
Ventura	184	213	340	366	3.3%	3.6%	3.8%	4.1%
Imperial	43	37	64	66	0.8%	0.6%	0.7%	0.7%
						---Growth over 1980---		
SCAG Region	5,581	5,923	8,954	8,954	--	6.1%	60.4%	60.4%

(continued)

Table 15 (continued)
GROWTH MANAGEMENT PLAN PROGRAM

County	Household Size 1984 Base	Household Size 1988 Exist	Household Size 2010[a] GMA-1	Household Size 2010[b] GMA-4MJH	Housing/Job Ratio 1980 Census	Housing/Job Ratio 1984 Base	Housing/Job Ratio 2010[a] GMA-1	Housing/Job Ratio 2010[b] GMA-4MJH
Los Angeles	2.69	2.78	2.59	2.58	72.5%	72.1%	69.4%	73.1%
Orange	2.72	2.70	2.49	2.50	78.8%	72.5%	63.7%	70.5%
Riverside	2.32	2.31	2.21	2.23	137.4%	132.0%	191.5%	129.2%
San Bernardino	2.48	2.46	2.29	2.24	130.0%	125.7%	151.6%	123.2%
Ventura	2.95	2.92	2.70	2.75	99.9%	92.3%	98.9%	90.9%
Imperial	3.04	3.11	2.69	2.70	74.4%	90.3%	92.8%	79.1%
SCAG Region	2.66	2.70	2.49	2.49	79.9%	78.5%	81.7%	81.7%

Ethnicity	Population (1,000) 1980	1990	2000	2010	Population Share 1980	1990	2000	2010
White-NH	7,026	7,318	7,462	7,489	56.7%	53.3%	40.9%	41.0%
Black-NH	1,040	1,359	1,639	1,862	8.4%	9.9%	9.0%	10.2%
Asian/Other-NH	716	1,071	1,420	1,698	5.8%	7.8%	7.8%	9.3%
Hispanic	2,807	4,326	5,849	7,207	22.7%	31.5%	32.0%	39.5%
						---Growth over 1980---		
Total	11,589	14,074	16,370	18,256	--	21.4%	41.3%	57.5%

(a) The Baseline Projection (GMA-1) is a trend projection based on demographic and econometric assumptions over the past decade, and indicates the results of the continuation of existing policies.

(b) The Proposed 1988 Growth Management Plan Policy Forecast (SCAG GMA-4MJH) uses the same regional total as the Baseline Projection, incorporating changes in the distribution of growth within the region due to changes in policies and implementation of growth management mechanisms.

Sources: SCAG. Baseline Projection: Impact Assessment. 1987.
SCAG. Growth Management Plan. Draft, June 1988.

One primary reason for the growth policy's focus on job/housing balance is to reap its beneficial effects on transportation demand and to minimize new facility construction needs. In this effort, the region's total population and employment has been held constant, and only the distributions within the region have been shifted. The overall effect on the urban region included in the regional transportation model was to increase GMA-4MJH population in the urban region over GMA-1 levels, and to decrease employment from GMA-1 levels, as shown on the second page of Table 15; conversely, outlying areas of rural Riverside, San Bernardino and Imperial Counties would see decreased population and increased employment in GMA-4MJH over GMA-1 levels.

No existing housing or jobs have been moved in this process; under the plan, growth patterns would be shifted for 4.5% of new houses and 11.1% of new jobs in the region. The Urban Subarea of the region would gain 70,000 dwelling units (an 8% change in its GMA-1 growth) and lose 335,000 jobs to outlying areas (a 20% change in growth). The Urbanizing Subregions would lose 120,000 dwelling units (a 9% change in growth) and gain 184,000 jobs (a 17% change in growth). The Mountain and Desert Subregions would gain 50,000 houses and 151,000 jobs (10% and 69% changes in growth respectively).

Job/Housing Balance. By 2010, under each growth scenario (GMA-1 or GMA-4MJH), the regional job/housing ratio would decrease to 1.22. This is mainly due to a combination of the continued growth of the elderly population cohort with more retired-worker households. The shifts in housing and employment growth patterns noted above would result in three more balanced subregions than in 1984, using the criteria described above. Three subregions would continue to be job-rich; however, Orange County's job-rich subregion will switch from being in the south county to being in the north county between 1984 and 2010, as shown in Figure 23.

As well as incorporating the GMA-4MJH forecast as the basis for plan development, the RMP includes an additional mechanism to support job/housing balance implementation. In outlying counties the RMP emphasizes intra-county roadway improvements and inter-county rail transit improvements over inter-county roadway improvements. With plan implementation, roadway capacity deficiencies would continue along Los Angeles-San Bernardino connections (including SR-60) and Orange-Riverside connections (SR-91), as illustrated in Figure 23.

Job/Housing Affordability. The changes in growth patterns cited as necessary to promote job/housing balance will require extensive on-going efforts on the parts of local jurisdictions. Changes in outlying areas would be especially significant (for example, the addition of 151,000 jobs to the Mountain/Desert Subarea - a 69% change in already high Baseline growth). However, for job/housing balance to result in the transportation benefits desired, an additional component must be incorporated. Housing in a subregion must be affordably priced relative to the income levels of employees working in that subregion. This is especially true for housing being added to job-rich subregions. Whereas in outlying areas lower land prices result in more affordable housing, in the more dense, urban areas, higher real estate values

push up housing costs and form the driving force which leads to job/housing imbalance.

A key to plan success - as well as to minimizing construction of new facilities as assumed in the RMP and EIR - will be identification of mechanisms for development of affordable housing through strategies which maintain the quality of housing and compatibility with existing and planned neighborhoods and communities.

RECOMMENDED MITIGATION

As the RMP and Growth Management Plan work in tandem to mitigate potential adverse impacts of growth and to serve existing and future mobility needs, the RMP does not result in adverse impacts on growth and no mitigation measures are recommended.

4.L. REGIONAL ECONOMY

REGIONAL SETTING

The SCAG region has a large, diverse, and mature economy. In 1984, the total Gross Regional Product (GRP), which measures the dollar value of all goods and services produced in the region, was approximately $234 billion; this total was surpassed by only 14 countries in the world.

Regional and County Employment. In 1984, there were 5.9 million jobs in the SCAG region, comprising 52% of California's total, which ranks it as one of the largest labor markets in the United States. In addition, the SCAG region is a major center for international trade. The value of international trade (imports and exports) in the SCAG region totaled $58.6 billion in 1984.

Nearly 70% of total regional employment is concentrated in Los Angeles County. Orange County has the second highest share of total employment (18%), and it experienced the largest employment growth of any county during the period 1980-1984. The Riverside-San Bernardino and Ventura County areas, although growing rapidly, total 14% of regional employment. Imperial County with about 40,000 employees is a major agricultural area with almost 20% of the region's total agricultural employment (see Table 16).

TABLE 16

EMPLOYMENT (1984)

County	Employment	Share
Los Angeles	4,053,000	68 %
Orange	1,048,000	18
Riverside	247,000	4
San Bernardino	325,000	5
Ventura	213,000	4
Imperial	37,000	0.6
SCAG REGION	5,923,000	100 %

Employment by Sector. The leading employment sector in the region is services, with 22% of total employment.[72] This sector is followed by trade and manufacturing. Together, these three sectors comprise about two-thirds of all employment, as detailed in Table 17. Over the past decade, there has been a dramatic shift in the Southern California economic base. The region has been undergoing a transition from a goods-producing, manufacturing economy to an information-based service economy. During 1972-1984, the manufacturing share of total employment declined from 23% to 20.5%. In contrast, the services share increased significantly from 17% to 22% and was the fastest growing sector. Other sectors with rapid employment gains were finance/insurance/real estate (known as FIRE) and trade (see Table 17).

TABLE 17

EMPLOYMENT BY SECTOR, SCAG REGION (1984)

Sector	Employment	Share
Agriculture	70,000	1%
Mining	22,000	0.4%
Construction	195,000	3%
Manufacturing	1,217,000	21%
Transportation	265,000	4%
Trade	1,277,000	22%
FIRE	353,000	6%
Services	1,305,000	22%
Government	724,000	12%
Self-Employment	496,000	8%
TOTAL	5,923,000	100%

Sources: Center for the Continuing Study of the California Economy, California Employment Development Department

[72] The service sector includes the following industries: Hotels, Motels, Recreation, Personal Services (Laundry, Barbers, etc.), Business Services (Advertising, Maintenance, Data Processing, Equipment Rental, Temporary and Security Services, etc.), Repair Services (Automobile, Electronic, etc.), Motion Pictures, Professional Services, Health Services, and Educational and Legal Services.

Employment Centers. Unlike many major metropolitan areas, employment in the SCAG region is not concentrated in a single major downtown area. The Los Angeles Central Business District (LA CBD) contains only about 5% of the region's total employment. Employment concentrations are dispersed among more than 69 centers (local areas are defined based on population and employment densities), several transportation corridors, and the dense Regional Core (extending from the LA CBD westward to Santa Monica). The Regional Core has the highest densities in the region, but it is not as dense nor does it dominate the region to the extent found in other large regions. In 1980, 16% of regional employment was in the Regional Core. General areas of the region having employment densities exceeding 15,000 employees per square mile in 1984 are listed below. There are many other areas in the region that are employment centers, but whose employment densities are below 15,000 employees per square mile.

Los Angeles County	Orange County	Riverside County
Los Angeles (LA CBD)	Garden Grove	Riverside
Mid-Wilshire	Anaheim	
Wilshire Corridor	Santa Ana	
Hollywood	Irvine Complex	
Burbank		
Glendale	San Bernardino Co.	
Pasadena		
LAX Airport and Vicinity	Upland/Ontario	
Long Beach/Port Area	San Bernardino	

Labor and Goods Flow Patterns and Efficiencies. The regional economy is dependent upon the ability of workers to get to and from jobs and upon the ability to move goods throughout the region on the ground transportation network. Inefficiencies in the movement of labor and goods can be detrimental to the economy. They can discourage businesses from locating in certain locations (or the region as a whole); they can discourage workers from working at various job locations.

The following describes the major flow patterns in the region, and a generalized description of the efficiencies of these labor flows. A description of goods flow patterns is also provided.

About 7.3 million home-work person trips occurred daily in 1984, out of 40 million total trips. Intra-county trips made up the greatest proportion of home-work trips in every county. Los Angeles County retains the highest percent of its work trips; Orange County and Ventura counties the second highest. About 11% of home-work trips are intercounty trips. Nearly one-third of both Riverside and San Bernardino counties' home-work trips are to other counties, but Orange County exports the greatest absolute number of home-work trips to other counties (see Table 18).

TABLE 18

DISTRIBUTION OF HOME-WORK TRIPS - 1984 (1,000)

	Los Angeles	Orange	Riv.	San Berndo	Ventura	Region
Intra-County	4,378 (96%)	1,222 (79%)	225 (68%)	322 (70%)	281 (78%)	6,428 (89%)
Inter-County	196 (4%)	319 (21%)	106 (32%)	136 (30%)	78 (22%)	835 (11%)
TOTAL	4,574	1,541	331	458	359	7,261

Source: SCAG. Regional Transportation Model. August 1988.

TABLE 19

LABOR FLOW EFFICIENCIES - HOME-WORK TRIPS, 1984

Average Trip Length	10.7 miles
Average Trip Time	19.1 minutes
Average Speed	33.7 mph
Auto Occupancy	1.13 persons
Transit Mode Split	6.58%

Source: SCAG. Regional Transportation Model. August 1988.

The average regional commute trip is not as long as many might suspect. It takes on average 19 minutes, and the average speed is about 34 mph. Only about 7% of all home-work trips are made by transit and the auto occupancy rate remains very low in the region. About 80% of all home-work trips carry only one person.

Goods Movement Patterns. Economic activities (industrial and commercial) are highly dependent on the region's transportation network for moving goods as well as labor. Goods movement centers on the Los Angeles/Long Beach ports area, the LAX and Ontario Airport areas and the various rail terminals within the region. These facilities are connected by the highway systems to commercial and industrial areas throughout the region. Many of these highways experience heavy congestion during peak travel periods.

Economic Costs of Travel. Travel in the region involves costs for all trip-makers, be they individuals or businesses. Two separate measures of travel costs are discussed below: personal vehicle operating costs, and costs of congestion.

Personal Vehicle operating Costs. The number of daily vehicle trips made in 1984 was 28.4 million, and daily vehicle miles traveled (VMT) was 221.3 million miles. This travel results in personal vehicle operating costs for the individuals making these trips (fuel and oil costs, maintenance costs, and ownership costs, eg. insurance, depreciation and license, registration and tax costs.) In 1984, estimated daily costs of $62 million and $15.7 billion annual costs ($1987), resulted based on VMT and total estimated vehicle costs per mile.

Costs of Congestion. About 10% of vehicle travel is spent in delayed or congested conditions, resulting in increased vehicle operating costs that would otherwise not occur. Delayed or congested travel also results in lost time for business-related trips, which translate into additional wages and overhead expenses (direct business costs), and for lost "opportunity costs" for commute and personal trips.

The direct costs of congestion associated with delayed travel in the modeled 1984 transportation system can similarly be estimated, as follows.[73] In 1984 daily congestion costs totaled $7.1 million, or $1.8 billion annualized ($1987). These costs exclude "nonrecurrent" congested costs associated with accidents.

The majority (75%) of the congestion costs are associated with the value of time, and the balance are associated with added vehicle operating costs (added fuel and oil consumption, maintenance, vehicle depreciation, etc.). The allocation of total daily congestion costs among three basic trip types is shown below.

The majority of daily congestion costs (61% or $4.4 million) is incurred on highways, the balance on arterials and secondaries.

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[73] SCAG. Costs of Congestion. 1987.

DAILY CONGESTION COSTS BY TRIP TYPE

Trip Type	Congestion Costs	Share
Business Trips [a]	$ 2.4 million	34 %
Commuter Trips [b]	1.8	26
Personal Trips	2.8	40
TOTAL ALL TYPES	$ 7.0 million	100 %

(a) Trips made by employees exclusively for business purposes; includes trucking.

(b) Home-to-work trips only.

Source: SCAG. Costs of Congestion. 1987.

PROJECT IMPACT

Regional economic impacts of the RMP are discussed below relative to the following areas:

- o Employment Growth
- o Access to Employment Areas
- o Labor Flow
- o Costs of Travel
- o Economics of Demand Management
- o Air Quality Sanctions

Economic Growth and the Regional Mobility Plan. The SCAG region is projected to undergo very significant economic growth over the next 25 years. SCAG's recent Baseline Projection indicates that by year 2010, employment will reach nearly 9 million jobs, an addition of 3 million jobs and more than half again as many jobs as existed in 1984. This would be equivalent to adding three-fourths of Los Angeles County's entire 1984 employment to the region, an annual average growth rate of 2%. This growth rate is actually less robust than the recent rate of 3.2% during 1972-1984.

The following information provides background on the economic growth projected for the region, including employment growth within counties and within various economic sectors. It is clear that the current transportation system already experiences considerable congestion problems in many areas of the region, and significant improvements will be needed to sustain a 50% increase in employment. The worst congestion today is experienced in Los Angeles and Orange counties where the bulk of labor and goods flows occur. The outlying counties experience less congestion, but congestion levels are increasing as economic activity expands in these counties and as workers living in these counties continue to commute into Los Angeles and Orange Counties.

A function of the Regional Mobility Plan (RMP) is to provide a long-range plan that attains and maintains transportation mobility for the overall level of population and employment growth projected for the region.

County Employment Growth. The RMP is intended to respond to levels of employment growth predicted for the region. The redistribution of county employment growth is a fundamental job/housing balancing measure advocated by the RMP to locate more new employment closer to where population growth will occur, in order to shorten home-work trips and lessen transportation needs.

About 300,000 of the projected job growth in the job-rich counties of Los Angeles and Orange is redirected to job-poor counties of Riverside, San Bernardino, and Ventura counties. This number is about 10% of all job growth between 1984 and 2010. New jobs would also be redirected from job-rich to job-poor subregions of Los Angeles County.

Ten out of 24 subregions would gain employment from implementation of job/housing balance policies, including the following:

- Glendale/Pasadena
- East San Gabriel Valley
- Oxnard/Ventura
- Simi/Thousand Oaks
- Chino
- East San Bernardino Valley
- Riverside/Corona
- Central Riverside
- San Bernardino Desert
- Riverside Desert

Just as some employment growth would be redirected in the job/housing balance measure of the RMP, so too would housing. Approximately 150,000 new housing units (and 350,000 people) would be redirected from housing-rich to housing-poor subregions. This primarily involves transfers between the outlying urbanizing counties and Los Angeles and Orange counties.

TABLE 20

EMPLOYMENT GROWTH - GMA-4MJH

County	1984	Added Employment 1984 - 2010	
Los Angeles	4,053,000	1,290,000	(31.8%)
Orange	1,048,000	751,000	(71.6%)
Riverside	247,000	362,000	(146.5%)
San Bernardino	325,000	447,000	(137.5%)
Ventura	213,000	154,000	(72.3%)
Imperial	37,000	27,000	(72.9%)
SCAG Region	**5,923,000**	**3,031,000**	**(51.1%)**

Source: SCAG. Growth Management Plan. August 1988.

Improved job/housing balance would reduce transportation facility needs in the future. The redirection of additional job growth to housing-rich subregions would require that a number of policy actions be taken to intervene with current market forces. A range of possible actions has been identified, including tax-revenue sharing, reallocation of economic development funds, increased emphasis on infrastructure funding and enterprise zones, and changes to state redevelopment laws.

Sectoral Growth. The region's economy is projected to move heavily into a service-based economy over the next 25 years, and the fastest growth is expected among small- and medium-sized businesses. Of the 3 million jobs to be added, about 45% would be in the services sector, followed by 22% in trade, 10% in manufacturing and 7% in finance/insurance/real estate.

Access to Major Employment Areas. Major employment areas are defined here as areas having 15,000 or more employees per square mile. Currently, 16 such areas exist in the SCAG region, nine of which are in Los Angeles. By 2010, six additional major employment areas would emerge within Orange, Riverside, and San Bernardino Counties.

The regional transportation model was run to assess the relative "accessibility" that home-to-work trips have to major employment areas. Accessibility is a function of levels of congestion on roadway facilities.

TABLE 21

ACCESSIBILITY TO MAJOR EMPLOYMENT AREAS
(Areas Having Greater Than 15,000 Employees Per Square Mile)

Employment Areas	1984	2010 RMP
Los Angeles County		
Los Angeles CBD	B/C	A/B
Mid-Wilshire	B	B
Wilshire Corridor	B/C	B
Hollywood	A/B	A/B
Burbank	A	B
Glendale	A	A
Pasadena	A	A
LAX Airport and Vicinity	C	B/C
Long Beach/Port Areas	B	B
Orange County		
Garden Grove	-	A
Anaheim	-	A
Santa Ana	-	A
Irvine Complex	-	A
Riverside County		
Riverside	-	A
San Bernardino County		
Upland/Ontario Area	-	A
San Bernardino	A	A

A = Very Good
B = Good
C = Fair
D = Very Poor

Source: SCAG. Regional Transportation Model. Unpublished, 1988.

Table 21 summarizes the relative accessibility of the region's major employment areas. This analysis results in the following findings:

- In 1984, most of the major employment areas in Los Angeles County had "good" or "fair" accessibility. A few had "very good" accessibility,

while none had "very poor" accessibility. Those with fair accessibility were the Wilshire Corridor and the LAX Airport and Vicinity areas.

- o Accessibility to major employment areas is similar to 1984 conditions in that nearly all areas would have very good, or good accessibility. Only one area would still have fair accessibility (LAX Airport and Vicinity) and no area would have "very poor" accessibility. The combination of job/housing balance and extensive demand management measures that reduce vehicle trips and shift many others to transit would render accessibility to all four major employment areas in Orange County very good.

Labor Flow. The region's economy is partly dependent on the ability to efficiently move workers to and from jobs. Inefficiencies in this movement can be detrimental to the economy, discouraging businesses from locating in highly congested areas (or the region as a whole), and also discouraging workers from working in various job locations.

Today, about 89% of all home-work person trips are intra-county - that is, they begin and end in the same county, while 11% are intercounty. Although relatively small in quantity, the intercounty work trips slow labor flows in the region and significantly contribute to congestion on cross-county highway facilities.

Under the RMP there would only be a 6% rise in total intercounty trips over by 2010; this small rise reflects the dramatic effects of the demand management measures (trip reduction, ridesharing and transit) employed in combination with increased job/housing balance.

TABLE 22

DISTRIBUTION OF HOME-WORK PERSON TRIPS (1,000)

	Intra-county	Intercounty	Region
1984	6,428 (89%)	835 (11%)	7,262 (100%)
2010 No Project	8,799 (86%)	1,479 (14%)	10,278 (100%)
2010 RMP	6,373 (88%)	888 (12%)	7,261 (100%)

TABLE 23

LABOR FLOW EFFICIENCIES - HOME-WORK TRIPS

	1984	No Project	RMP
Average Trip Distance (miles)	10.7	12.4	11.4
Average Trip Time (minutes)	19.1	40.1	18.7
Average Speed (mph) (All Facilities)	35	19	36

Source: SCAG. Regional Transportation Model. August 1988.

The lack of transportation improvements under No-Project conditions would result in significantly worse congestion for home-work travel than today's levels. Average daily commute time would more than double by 2010 from 19 minutes to 40 minutes, and the average daily speed for home-work trips would slow by 45% from 34 mph to 19 mph. Also, the average distance from work trips would significantly increase from 10.7 miles to 12.4 miles; this would largely be due to job/housing imbalances throughout the region. However, it is assumed that while the locations and types of employment centers would differ under No-Project conditions, the numbers of jobs would remain the same in the region.

The RMP would be able to achieve labor flow efficiencies similar to or slightly better than today's levels, in terms of both average commute time and average speed of the commute trip. This is achieved through the varying mixture of facility development, job/housing balance and demand management actions incorporated into the plan.

An additional measure of labor flow efficiencies is the performance of the transportation system during peak AM and PM periods of travel (6:30-8:30 am and 3:00-6:00 pm) when most home-work travel occurs, as follows:

- The No Project would result in a significant increase in delayed travel by 2010. In the AM peak, delay would grow from 16% of all travel to 70%; in the PM peak, it would grow from 20% to 62%. The most dramatic increases in delayed travel would occur in Riverside and San Bernardino counties. For example, in Riverside County, during the AM peak, delayed

travel would be 80% of total travel compared with 6% in 1984.

- The RMP would reduce delayed travel at both the regionwide and county levels, and would actually reduce delay to below 1984 levels in both the AM and PM peaks. The RMP is capable of reducing delayed travel for most counties (Los Angeles, Orange, and Ventura) to levels below 1984, but delay would continue above current levels in Riverside and San Bernardino Counties.

Costs of Travel. As detailed in the Regional Setting, travel in the SCAG region carries with it certain costs for both individuals and businesses. The following are three different measures of travel costs and a comparison of these costs between existing (1984), No Project and the RMP.

- Personal vehicle operating costs,
- Costs of congestion, and
- Parking space costs.

Personal Vehicle Operating Costs. Table 24 summarizes the daily VMT as well as daily and annualized personal vehicle operating costs. These costs are based on VMT and estimated operating costs per mile (for fuel, vehicle maintenance and various ownership costs, such as depreciation, insurance, license and registration fees).

Table 24

PERSONAL VEHICLE OPERATING COSTS ($1987)

	VMT (millions)	DAILY (million)	ANNUALIZED (billion)
1984	221.3	$ 62.0	$ 15.7
2010 No Project	376.2	105.3	26.6
2010 RMP	281.2	78.7	19.9

Source: SCAG. Costs of Congestion. 1987.

Under No-Project conditions, operating costs would rise to $26.6 billion per year from $15.7 billion in 1984, a 70% increase. The RMP, however, would result in an annual savings of $6.7 billion over No Project.

The RMP results in lower vehicle operating costs because of the decreased vehicle travel from demand management measures which result in greatly reduced home-to-work trip-making and increased transit usage.

Costs of Congestion. The portion of all travel that is spent in delayed or congested conditions results in not only added vehicle operating costs, but also lost time costs. The lost time for business trips would translate into additional wages and overhead expenses; the lost time for commute and personal trips translates into lost opportunity costs.

Table 25 summarizes the amount of daily travel delay (peak and off-peak) that would occur, expressed in percent of vehicular hours traveled, and the estimated costs of congestion (i.e., added vehicle operating costs and time costs) associated with the delayed travel.

The No Project scenario would result in congestion costs rising 14-fold. This is due to two major factors: a significant 70% increase in VMT, and delayed travel making up about 50% of all travel, compared with 10% today. As operating speeds fall very low, cost would become very high.

The RMP would result in significantly lower congestion costs than the No Project because it has less VMT and significantly less delayed travel. The congestion costs of $2.6 billion annually under the RMP compare favorably with the 1984 cost of $1.8 billion. Congestion costs under No Project would be a staggering $26.3 billion annually.

Table 25

COSTS OF DELAY

	Percent Vehicle Hours Traveled Spent In Delay	Daily Congestion Costs ($1987)	Annual Congestion Costs ($1987)
1984	10%	$ 7.1 M	$ 1.8 B
2010 No Project	52%	104.1 M	26.3 B
2010 RMP	11%	10.3 M	2.6 B

Parking Costs. Growth in vehicular traffic is projected to occur in parallel with the significant growth in population and employment. This growth in travel will require provision of additional parking facilities (structures and surface facilities), as detailed in Table 26.

Table 26

PARKING COSTS ($1987)

	Additional Structure Parking Costs [a]	Additional Surface Parking Costs [b]	Total Costs
1984	$ 5.6 B	$ 4.3 B	$ 9.9 B
2010 No Project	7.2 B	6.3 B	13.5 B
2010 RMP	3.6 B	3.8 B	7.4 B

(a) Assumes an average cost of $10,000 per parking structure space, reflecting a blend of above and below-ground parking structure costs. Trips going to centers are assumed to use surface parking structures.

(b) Assumes an average cost of $2,500 per surface parking space. Surface parking includes at grade parking lots and street parking. Trips going to non-centers are assumed to use surface parking.

Source: SCAG, 1988.

Economics of Demand Management. The RMP relies heavily on specific demand management actions that are intended to change travel behavior with the following results:

- A significant number of daily person trips are made in the region are eliminated altogether.
- A significant number of daily vehicle trips are reduced through increased carpooling and transit use.
- The amount of highway facility development needed in the region is consequently reduced.

The demand management actions focus on reducing home-work trips made in the region, because these trips are concentrated in the peak periods. Under the RMP, home-work person trips in 2010 would be nearly the same as in 1984 while home-work vehicle trips would be 18% lower than 1984.

Demand Management Effects on Transportation Costs. The major decrease in projected home-work person trips and vehicle trips would result in significant capital cost savings for needed highway and HOV system improvements because far fewer of these improvements would be needed. The highway capital costs for the RMP are calculated at $8.4 billion. The reduced highway system needs also mean that more land in the region could be devoted to other economic uses - less land is needed for highway development and also for parking at or adjacent to employment sites, due to increased ridesharing, transit use and telecommunication (work-at-home).

However, it needs to be understood that the demand management actions would require high annual operating costs. These demand management operating costs total $1.8 billion/year. Over 85% of the costs are associated with maintaining desired ridesharing in carpools, vanpools, park-n-ride service and commuter express buses.

Effects of Demand Management Actions on Businesses. Recent literature has addressed the various economic advantages and disadvantages to employers of sponsoring the following types of demand management measures:[74]

- Telecommuting, and
- Modified work weeks.

Telecommuting

Advantages

- Increased productivity, due to fewer distractions, ability of employees to work at their peak times.
- Decreased turnover (with corresponding decreases in recruitment and training costs), due to higher morale, increased flexibility.
- Competitive advantage in hiring the most highly qualified workers.
- Ability to tap new labor pools (handicapped, geographically remote).
- Decreased overhead because less office space required and/or cheaper space in outlying areas becomes feasible; decrease in fringe benefits if employee put on independent contractor or part-time basis.
- Public relations value in contributing to reduced pollution, congestion.

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[74] SCAG. The Telecommunications Phenomenon: Overview and Evaluation. 1985.

Disadvantages

- Start up (and some operating costs) involved with equipment purchase or lease; satellite or neighborhood work center arrangements; manager and employee preparation and adjustment.
- Potential need to change managerial styles (more frequent communication and organization).
- Security of data more difficult to maintain.
- Decreased availability of employees for short-notice meetings.
- Possible loss of corporate identification by employees.
- Possible reflection on credibility of organizations.

Many of the potential disadvantages are most germane to the full-time work-at-home version of telecommuting. Telecommuting usually is most feasible when it is used by part and not all of a company's work force. Also, certain types of work are not good candidates for telecommuting (highly people-interactive work and work requiring a lot of accessories such as files, books, and office equipment). Paper and information-based work on the other hand, is more appropriate to telecommuting.

Modified Work Weeks

Modified work weeks eliminate home-work trips by compressing the work week into fewer days (4/40 and 9/80 schedules). They also eliminate many trips made during the peak period by modifying work schedules. Recent literature in the management and personnel fields cites the following economic advantages and disadvantages to employers sponsoring modified work weeks:

Advantages

- Increased employee productivity and improved employee morale (some literature states that work volume is not necessarily improved, but that work quality is enhanced).
- Less absenteeism and reductions in paid absences.
- Reduced turnover, training, and recruitment costs.
- Improved customer service (extended hours for providing direct services to the public).
- Improved communications with the East Coast time zones.

- Reduced congestion on elevators and at plant gates.

Disadvantages

- Adjustments needed to corporate routines (scheduling).
- Potentially increased problems in employee communications, meeting schedules and general coordination of work among employees.
- Potentially inadequate staffing during non-core hours.

The literature suggests that modified work weeks have the highest success rates for the following kinds of work: corporate and government administration; casework; data management; and information processing; medium success rates: jobs involving teamwork and piecework; lower success rates: retailing and walk-in customer services; manufacturing; and in general, companies employing fewer than 25 persons.

Potential Sectoral Effects of Demand Management. The RMP uses demand management actions to significantly reduce the number of daily home-work trips made in the region by 2010. For example, workers would generate about 40% fewer work-related vehicle trips than under No Project. This would be accomplished through increased transit, ridesharing and telecommunications.

Decreased vehicular activity in the RMP could lead to somewhat slower growth in the automobile-related sectors of the economy than otherwise projected under the Baseline Projection. This is because automobiles would depreciate less quickly and require less maintenance. Also, residents may find they need fewer automobiles per family given greater usage of transit, ridesharing, and telecommunications. However, instead of two moderate-priced cars, families may choose to purchase one single luxury car. The following are the automobile-related sectors that may undergo slower growth than otherwise projected:

- Gasoline Service Stations - Retail Sales
- Automotive Parts & Supplies - Retail Sales
- Automotive Dealers
- Automotive Repair Shops & Services
- Manufacture of Petroleum Products
- Manufacture of Motor Vehicles & Equipment

In addition, reduced highway construction in the RMP would lead to slower growth in the highway construction industry, although construction related to rail development would increase.

Reduced growth in the above-noted automotive sectors of the regional economy under the RMP will likely lead to more growth than projected in other economic sectors. Because consumers would spend less on automobile related expenses, they would have more disposable income to spend on such things as

services, retail trade and real estate. Overall, what is expected is not lessened overall economic growth, but rather a redistribution of employment growth among sectors.

Potential Economic Impact of Air Quality Sanctions. The Environmental Protection Agency (EPA) has recently stated that it may be "forced to ban major new air pollution sources in greater Los Angeles." This was in response to the unmet December 1987 deadline for South Coast Air Basin and Ventura counties to meet health and safety standards for ambient air concentrations of carbon monoxide and ozone. If sanctions are imposed, placing a ban on further construction of air pollution sources and cutting off funds for sewage treatment and highway expansion, then economic growth in greater Los Angeles would be severely adversely affected. The RMP's emphasis upon demand management may help the situation in the region because it attempts to reduce personal trips as well as reduce travel distances. In this way air pollution in the region may be diminished. The RMP may offer the region an opportunity to attain necessary air quality standards and avert economic sanctions.

RECOMMENDED MITIGATION

The RMP is expected to result in a significant beneficial effect on the regional economy through provision of access to employment and business centers and facilitation of commerce through the movement of goods and labor. However, SCAG should continue to investigate perceived adverse impacts of Demand Management on business through the on-going study of the social and economic effects of TDM. SCAG should assist employers in overcoming these effects and in making adaptations to TDM measures.

5. Findings: Impacts and Benefits

5. FINDINGS: IMPACTS AND BENEFITS

This section of the EIR provides systematic documentation of various CEQA-required findings regarding the potential long-term environmental effects of the RMP program. The following findings sections are included below:

- o Adverse Impacts
- o Beneficial Effects
- o Unavoidable Significant Adverse Impacts
- o Irreversible Significant Adverse Impacts
- o Short-term Value Versus Long-term Productivity
- o Growth-inducing Impacts

A. ADVERSE IMPACTS

This section summarizes potential regionally significant adverse environmental impacts associated with the 1988 SCAG Regional Mobility Plan, for each of the EIR's twelve (12) environmental subject areas. These impacts and recommended mitigation measures have been detailed in Sections 4.A.-4.L. of this EIR.

A. Mobility and Access. No regionally significant adverse impacts.

B. Air Quality. No regionally significant adverse impacts.

C. Energy Conservation. No regionally significant adverse impacts.

D. Geology and Seismicity. Added facilities without adequate mitigation would carry the potential for exposure of people and property to geologic hazards, particularly for projects requiring elevated structures or those located in fault zones or areas with high potential for liquefaction, subsidence or landslides. Potentially significant erosion and slope failure could occur as a result of highway and transit projects requiring new construction, particularly in steeply sloping areas.

E. Biological Resources. Although a majority of proposed new facilities would be located in already developed areas with few biological resources to be affected, the RMP contains several highway construction projects that could cause the loss of regionally significant amounts of terrestrial habitat or pose a significant risk to rare or endangered species or areas of ecological significance. High speed rail facilities could also adversely affect significant coastal and desert biological resources.

F. Water Resources. Several projects adding highway and transit facilities may change the flow patterns of existing surface water resources, increase runoff quantity and reduce runoff water quality, if appropriate mitigation measures are not implemented. Construction impacts could increase total dissolved solids and turbidity of surface water runoff and result in

siltation of some surface water courses and water bodies.

G. Visual Resources. Construction of new freeways and transit guideways without adequate mitigation, especially proposed aerial alignments, can disrupt or block views.

H. Noise. New roadway and transit facilities will add to existing noise sources. Aerial alignments will expand noise contours around existing and proposed facilities. Alternative work schedules may create more traffic noise during sensitive times of day.

I. Cultural Resources. Construction of proposed projects without adequate mitigation can result in potential destruction of cultural and scientific resources.

J. Social Impacts. Some new facilities will result in displacement of residences and businesses. Construction and operation of facilities without adequate mitigation may disrupt communities. Some aspects of TDM measures are perceived as adversely impacting the regional social fabric; on-going studies are examining the adverse social impacts of demand management.

K. Urban Form and Growth. No regionally significant adverse impacts. The RMP both incorporates and serves as mitigation for implementation of the SCAG 1988 Growth Management Plan GMA-4MJH Policy Forecast.

L. Regional Economy. Some aspects of TDM measures are perceived as detrimental to business; on-going studies are examining potential adverse economic impacts of demand management.

B. BENEFICIAL EFFECTS

This section summarizes potential regionally significant beneficial environmental effects associated with the 1988 SCAG Regional Mobility Plan, for each of the EIR's twelve (12) environmental subject areas. These effects have been detailed in Sections 4.A.-4.L. of this EIR.

A. Mobility and Access. The RMP would attain and maintain mobility in an environment of continuing population and economic growth.

B. Air Quality. The RMP would apply TDM, TSM, growth management and AQMP TCMs to reduce air impacts of growth and travel. Under the RMP and AQMP, the South Coast Air Basin would attain federal standards for all criteria pollutants except ozone, which would be approached under full implementation.

C. Energy Conservation. With an alternative fuels mitigation program, overall on-road energy consumption would decline, despite increased travel.

D. Geology and Seismicity. No substantial beneficial effects.

E. Biological Resources. No substantial beneficial effects.

F. Water Resources. No substantial beneficial effects.

G. Visual Resources. Proper design of new facilities may open up public access to the region's scenic resources. RMP measures which reduce congestion and which upgrade facilities to controlled access allow for reduced commuter stress, increased appreciation of the aesthetic environment for facility user and viewer alike, and improved visibility through cleaner air.

H. Noise. Lower congestion levels may reduce trip diversion and neighborhood traffic intrusion.

I. Cultural Resources. No substantial beneficial effects.

J. Social Impacts. The RMP would improve access to and ties between communities of the region. Transit measures would improve access to transportation facilities for the growing transit dependent population.

K. Urban Form and Growth. Overall, the RMP accommodates planned growth and incorporates measures to improve job/housing balance.

L. Regional Economy. The RMP would provide access to employment centers, facilitate goods movement and stimulate local economies.

C. UNAVOIDABLE SIGNIFICANT ADVERSE IMPACTS

This section summarizes which of the potential regionally significant adverse environmental impacts cited above that can not be avoided through recommended mitigation, for each of the EIR's twelve (12) environmental subject areas. Although unavoidable adverse impacts must be weighed against beneficial effects of the RMP, these impacts would be expected to persist with plan implementation even in conjunction with full levels of effort with respect to recommended mitigation measures.

A. Mobility and Access. No regionally significant adverse impacts.

B. Air Quality. No regionally significant adverse impacts.

C. Energy Conservation. No regionally significant adverse impacts.

D. Geology and Seismicity. After mitigation, transportation facilities would continue to be exposed to potential hazards from seismic risks, erosion and slope failure.

E. Biological Resources. Although proper alignment of new facilities can reduce impacts on specific sites of significant biological resource value, the overall effects of some of the major new construction projects would

inevitably be the loss of large amounts of habitat areas.

F. Water Resources. With proper facility alignment, design, and construction practices, most regionally significant impacts on water resources could be averted, and the RMP would not result in regionally significant adverse impacts.

G. Visual Resources. After mitigation, construction of new freeways and transit guideways, especially proposed aerial alignments, could disrupt or block views.

H. Noise. After mitigation, new roadway and transit facilities will continue to add to existing noise sources. Aerial alignments will expand noise contours around existing and proposed facilities. Alternative work schedules may create more traffic noise during sensitive times of day.

I. Cultural Resources. With incorporation of adequate measures of testing for scientific resources, and salvage of cultural and scientific resources, proposed projects would not result in regionally significant destruction of cultural and scientific resources.

J. Social Impacts. With mitigation, some new facilities will continue to result in displacement of residences and businesses. Construction and operation of facilities may disrupt communities. Some aspects of TDM measures are perceived as adversely impacting the regional social fabric; on-going studies are examining the adverse social impacts of demand management.

K. Urban Form and Growth. No regionally significant adverse impacts.

L. Regional Economy. Some aspects of TDM measures are perceived as detrimental to business; on-going studies are examining potential adverse economic impacts of demand management.

D. IRREVERSIBLE SIGNIFICANT ADVERSE IMPACTS

The RMP would result in an irreversible commitment of several types of non-renewable resources, as itemized below. Although the RMP represents a further commitment to the patterns of resource consumption that already characterize the existing transportation system and regional culture, the plan employs measures to reduce irreversible impacts through a combination of growth management, demand management, system management and air quality conformity measures.

A. Mobility and Access. No irreversible impacts.

B. Air Quality. No irreversible impacts.

C. Energy Conservation. Regional travel would continue to consume energy resources. However, dependence on non-renewable oil resources would be reduced to the extent that the RMP succeeds in implementing programs for alternative fuels and energy systems based on non-fossil fuel sources.

D. Geology and Seismicity. Construction of RMP projects would result in alterations to topography and consumption of mineral resources.

E. Biological Resources. Potential habitat loss associated with the construction of transportation projects would most likely be irreversible. The RMP could result in the irreversible loss of rare or endangered species or significant ecological areas if adequate mitigation measures are not implemented.

F. Water Resources. No irreversible impacts with proper mitigation.

G. Visual Resources. No irreversible impacts.

H. Noise. No irreversible impacts.

I. Cultural Resources. No irreversible impacts with proper mitigation.

J. Social Impacts. Displacement of residences and businesses, and community disruption impacts would be relatively irreversible.

K. Urban Form and Growth. No irreversible impacts; the RMP would result in significant beneficial effects, accommodating growth and improving job/housing balance.

L. Regional Economy. No irreversible impacts.

E. SHORT-TERM VALUE VERSUS LONG-TERM PRODUCTIVITY

Many potential adverse impacts of the RMP are due to construction of proposed transportation facilities; although construction activities for major facilities may be phased over several years, resultant impacts must be analyzed in the context of the long-term productivity of the environment - especially in mobility and related subject areas. This section summarizes potential impacts regarding trade-offs between short-term value and long-term productivity of the environment, associated with the 1988 SCAG Regional Mobility Plan, for each of the EIR's twelve (12) environmental subject areas.

A. Mobility and Access. The RMP would result in long-term improvements in mobility and accessibility throughout the region.

B. Air Quality. The RMP would result in long-term attainment of air quality standards and cleaner air.

C. Energy Conservation. The RMP would result in long-term reduction in energy consumption rates. Dependence on non-renewable oil resources would be reduced to the extent that the RMP succeeds in implementing programs for alternative fuels and energy systems based on non-fossil fuel sources.

D. Geology and Seismicity. The RMP would result in replacement and upgrading of many existing facilities with improvements better able to withstand geologic hazards. However, construction of RMP projects would result in alterations to topography and consumption of mineral resources.

E. Biological Resources. Construction of transportation projects may result in long-term potential for habitat loss and impacts on rare or endangered species or significant ecological areas if adequate mitigation measures are not implemented.

F. Water Resources. Construction impacts on surface water resources would be short term and could be partially mitigated; long-term changes to water courses would include channelization and construction of culverts.

G. Visual Resources. Depending on the specific project, long-term effects would be beneficial where scenic designations are implemented, and adverse for many other new facilities, especially those with aerial configurations.

H. Noise. The RMP would result in long-term adverse impacts on environmental noise. If appropriate mitigation actions are not taken, increased noise levels could result in annoyance, interruption of activities at specific land uses, decreased local land values and possible health problems. However the RMP would reduce congestion and trip diversion, decreasing potential noise impacts from residential traffic intrusion.

I. Cultural Resources. The RMP would not result in long-term impacts to cultural and scientific resources with proper mitigation.

J. Social Impacts. The RMP would require short-term adaptations to demand management measures, and in some cases relocations, which would be followed by long-term improvements to mobility and access.

K. Urban Form and Growth. The RMP would make feasible long-term achievement of SCAG GMA-4MJH growth forecast levels.

L. Regional Economy. The RMP would require short-term adaptations to demand management measures, which would be followed by long-term improvements to mobility and access. Planned highway and transit facility developments would mandate capital expenditures and operating costs through the year 2010.

F. GROWTH-INDUCING IMPACTS

The Regional Mobility Plan's combination of facility improvements and demand and system management measures accommodates and facilitates a growth forecast policy which mitigates and reduces the impacts of existing trends in regional growth. Rather than inducing growth and attaining levels projected under the SCAG 2010 Baseline Projection, the RMP is based on and facilitates a growth forecast which retains the same regional growth total, yet differs from existing trends by redistributing population and employment growth to achieve better job/housing balance by subregion.

The differences between the proposed growth forecast (GMA-4MJH) and the Baseline Trend Projection (GMA-1) are discussed in detail in the EIR on the Growth Management Plan, and are summarized by this EIR in Section 4.K. The proposed growth forecast (GMA-4MJH), compared to GMA-1, would shift population and housing growth from Orange, Riverside, San Bernardino and Imperial Counties to Los Angeles and Ventura Counties. It would shift added employment from Los Angeles and Orange Counties to the other, outlying counties of the region. In all, subregional growth patterns would be shifted for 4.5% of new houses and 11.1% of new jobs in the region.

6. Alternatives

6. PROJECT ALTERNATIVES

CEQA requires consideration of alternatives to any project for which an EIR identifies significant adverse impacts, in an effort to identify an environmentally superior alternative. The following five (5) alternatives to the proposed RMP are considered separately in this section:

A. No change in pre-project conditions;
B. Implementation of a facilities-intensive response to the Baseline growth projection (GMA-1);
C. Implementation of a facilities-intensive strategy with balanced growth (GMA-2);
D. Implementation of a Demand Management strategy with balanced growth (GMA-2); and
E. Implementation of a Demand Management response to Baseline growth (GMA-1).

Consideration of Alternative A is specifically mandated by CEQA, while the selection of other alternatives is intended to evaluate a range of possible means towards achieving the program's primary objective: to attain and maintain mobility in an environment of continuing population and economic growth. The Alternatives are detailed in an Evaluation Matrix - Table 27, where they are compared to existing (1984) conditions and to the Proposed RMP. Each alternative in this section is evaluated more schematically than was the proposed project, because assumptions regarding the alternatives' implementation and operation are somewhat hypothetical, and because it is possible to draw upon the more detailed analyses already presented concerning the proposed project in Section 4.A-L.

Alternatives Methodology. The RMP has been specifically designed to minimize construction impacts from development of new facilities. During plan development, four strategies were examined, including the following:

- o No Project: Baseline Growth (GMA-1) with the Existing+Funded system.
- o Strategy 1: A Facilities Response to Baseline Growth (GMA-1).
- o Strategy 2: A Facilities Emphasis with Job/Housing Balance (GMA-2).
- o Strategy 3: A Demand Management Emphasis with Balanced Growth (GMA-2).
- o Strategy 4: A Demand Management Response to Baseline Growth (GMA-1).

The No Project scenario was reviewed throughout this EIR along with the proposed program, and summarized above as EIR Alternative A. The results of the facilities response strategies (1 and 2) were very similar, as were the results of Strategies 3 and 4. Since the proposed RMP is most closely related to a combination of Strategy 3 and the GMA-4MJH (Growth Management Plan) socio-economic forecast, results of the proposed project and Strategy 3 are somewhat similar.

Three color maps for each of Strategies 1-4 follow this section, and depict the mixed-flow, HOV and transit improvements examined in the alternatives evaluation.

The SCAG 1984 Regional Transportation Plan (RTP). The currently-adopted RTP for the SCAG region was approved by the SCAG Executive Committee April 5, 1984. The program of transportation improvements included in the 1984 RTP was based on the SCAG-82 Growth Forecast Policy regarding regional growth and travel demand through the year 2000. During the updating of this growth forecast for the current Regional Strategic Plan, SCAG extended trend projections to the year 2010 and included various technical improvements over past methodologies. The Baseline Projection incorporates new information on demographic immigration and fertility rates, as well econometric modeling of the region's employment base relative to state and national sectoral growth rates.

Extension of the planning horizon to the year 2010 and incorporation of this new information resulted in the conclusion that regional totals for population, housing and employment could not remain at SCAG-82 or SCAG-82M levels. The Baseline Projection, as well as the subsequent GMA-4MJH growth forecast, is based on a growth level 2.4 million higher in population and 0.6 million higher in employment than the previously-adopted year-2010 forecast. Furthermore, attempts to cap growth at the lower levels have the potential to exacerbate the projected job/housing imbalance due to market forces driving up prices for scarce housing in job-rich subregions. It is for these reasons that the currently-adopted 1984 RTP is in need of revision with the proposed RMP and does not continue to be a viable alternative to accomplishing the mobility plan's primary objective: To attain and maintain mobility in an environment of continuing population and economic growth.

A. NO PROJECT

This alternative would be invoked automatically via disapproval of the proposed RMP by the SCAG Executive Committee. The near-term environmental consequences of a denial would amount to a planning freeze of existing policies for the region. Current traffic congestion and resultant environmental impacts would continue despite interim operation of local agency's facilities development, operation and maintenance programs.

It should be recognized, however that disapproval of the proposed RMP would only preclude the development and operation of the specific proposal and it would not preclude a subsequent proposal by the Association of Governments for a similar program with a different emphasis, design, etc. and resultant environmental implications. As a result, especially for a program where the purpose is to mitigate existing and future environmental impacts, the No Project alternative is seen as a means of deferring a decision for implementation of needed improvements, and not as a legitimate alternative with long-term implications.

From a technical perspective, the No-Project Alternative is analogous to GMA-1 (the Baseline Projection) with the Existing+Funded transportation system. As analyzed in the Baseline Projection Impact Assessment, such an alternative would result in severe environmental consequences.[75] The No Project Alternative is also seen as analogous to the potential impact of application of EPA sanctions on the South Coast Air Basin for nonattainment of federal clean air standards for ozone and carbon monoxide. Sanctions would begin with a construction ban on new large stationary sources and the withholding of federal highway construction funds. This would result in the continued construction of housing, especially in outlying housing-rich subregions due to the potential economic impacts of a long-term construction ban; growth would continue in the face of a freeze on construction of highways beyond the Existing+Funded system.

In almost all aspects, the No Project alternative would fail to achieve any of the plan's objectives. Resultant congestion would increase delay to more than 30 minutes on the hour; over 2,500 lane-miles of congestion would impact the AM peak period, and over 4,500 in the PM peak. Transit ridership would drop to 5.1% for home-to-work trips region-wide. Air emissions would continue to decline, however, due to the constant influx of new cars into the fleet mix, and noise and construction impacts would be averted. In fact, as detailed in 4.H. - Noise, the severe congestion of the No-Project Baseline conditions would reduce freeway speeds so significantly that most existing soundwalls could be done away with and no new ones built. Nevertheless, on-road fuel consumption would almost double under No Project conditions, as detailed in 4.C. - Energy Conservation.

In short, the No Project Alternative would forego temporary short-term impacts such as construction impacts, capital expenditures for facility improvements, and social adjustments to demand management measures only to bring about severe long-term impacts to regional mobility, economic viability and access.

B. FACILITY-INTENSIVE RESPONSE TO GROWTH TRENDS

Alternative B, also known as Mobility Strategy 1, would program construction of 7,660 lane-miles of freeway improvements compared to the proposed program of 3,097 mixed-flow and HOV lane-miles. Though Alternative B includes comparable levels of transit corridor development - 367 miles compared to the Draft RMP's 360 miles - the lack of comparable TDM measures results in a transit mode share of 7.6% compared to the proposed 19.3%.

The alternative achieves high freeway speeds of 48 mph through intensive construction of mixed-flow and HOV improvements. Construction impacts would be more significant and added VMT would exceed the plan's cap objective of a

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[75] SCAG. Baseline Projection: Impact Assessment. March 1987.

maximum of 60 million additional vehicle-miles traveled. However, addition of 2,297 lane-miles of HOV facilities would boost ridesharing to achieve an average home-to-work auto occupancy of over 1.20 persons per vehicle.

Air emissions would be higher than the proposed project for all pollutants, though no pollutant's emissions would represent an increase over 1984. Fuel consumption would also be higher - 16.0 million gallons of gasoline per day, compared to 13.8 million in 1984.

C. FACILITY-INTENSIVE EMPHASIS WITH BALANCED GROWTH

Alternative C, also known as Mobility Strategy 2, incorporates a forecast for balancing jobs and housing by subregion (GMA-2) in order to reduce transportation infrastructure needs. The alternative represents a program for construction of 6,043 lane-miles of freeway improvements compared to the proposed program of 3,097 mixed-flow and HOV lane-miles. As with Alternative B, though Alternative C includes comparable levels of transit corridor development - 294 miles compared to the Draft RMP's 360 miles - the lack of comparable TDM measures again results in a transit mode share of 7.4% compared to the proposed project's 19.3%.

Like Alternative B, this alternative achieves freeway speeds of 50 mph through intensive construction of mixed-flow and HOV improvements. Construction impacts would be more significant and added VMT would still exceed the plan's cap objective of a maximum of 60 million additional vehicle-miles traveled. However, addition of 1,817 lane-miles of HOV facilities would boost ridesharing to achieve an average home-to-work auto occupancy of over 1.20 persons per vehicle.

Although not as extreme as under No-Project conditions or with Alternative B, air emissions would still be higher than the proposed project for all pollutants; yet no pollutant's emissions would represent an increase over 1984. Fuel consumption would again prove to be higher than the proposed project - 15.3 million gallons of gasoline per day, compared to 13.8 million in 1984.

D. DEMAND MANAGEMENT EMPHASIS WITH BALANCED GROWTH

Alternative D, also known as Mobility Strategy 3, incorporates both the forecast for balancing jobs and housing by subregion (GMA-2) and demand management (TDM) measures in order to further reduce transportation infrastructure needs. The alternative represents a program for construction of 1,858 lane-miles of freeway improvements compared to the proposed program of 3,097 mixed-flow and HOV lane-miles. Due to inclusion of all the TDM measures of the proposed project, as well as comparable levels of transit corridor development - 397 miles compared to the Draft RMP's 360 miles - the alternative results in a transit mode share of 19.4% compared to the proposed project's 19.3%.

With facility improvements almost half that of the proposed project, Alternative D would be expected to result in a much lower level of construction impacts on both the natural and built environment. Displacements due to expansion of right-of-way would be minimized through this alternative. As added VMT would stay below the plan's cap objective of a maximum of 60 million additional vehicle-miles traveled, air emissions would be about the same as the proposed project: ROG and SOx would be lower than the proposed project; NOx and CO would be higher than that of the plan. Fuel consumption would also be comparable to the proposed project - 13.4 million gallons of gasoline per day, compared to 13.8 million in 1984.

E. DEMAND MANAGEMENT RESPONSE TO GROWTH TRENDS

Alternative E, also known as Mobility Strategy 4, incorporates the proposed project's demand management (TDM) measures, but not the forecast for balancing jobs and housing by subregion - this alternative is run under GMA-1 The alternative represents a program for construction of 2,766 lane-miles of freeway improvements compared to the proposed program of 3,097 mixed-flow and HOV lane-miles. Due to inclusion of all the TDM measures of the proposed project, as well as higher levels of transit corridor development - 499 miles compared to the Draft RMP's 360 miles - the alternative results in a transit mode share of 19.5% compared to the proposed project's 19.3%.

With facility improvements comparable to that of the proposed project, Alternative E would be expected to result in about the same level of construction impacts on both the natural and built environment. The alternative places a higher emphasis on transit facilities since denser employment centers require additional access improvements under conditions of poor job/housing balance. Also due to use of GMA-1, VMT would again exceed the plan's cap objective of a maximum of 60 million additional vehicle-miles traveled. Emissions of NOx and CO would exceed those of the proposed project, and other pollutants would be about the same; gas consumption would be slightly higher than under the proposed program - 14.4 million gallons per day.

F. ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Given the high levels of travel demand presented by the Baseline Projection, the proposed RMP, incorporating the Growth Management Plan and Air Quality Management Plan, provides a balanced mix of growth management to improve job/housing balance, transportation demand management to reduce vehicle-trip demand, transportation system management to better coordinate the operation of existing transportation facilities, and finally an integrated system of roadway and transit facility development to provide adequate levels-of-service of mobility and access to the region for the remaining travel demand. None of the alternatives is clearly superior to the proposed project.

Table 27:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
MOBILITY			
Vehicle Miles Traveled (Thousands)	221,292	284,382	376,187
Vehicle Hours Traveled (Thousands)	6,343	7,850	19,575
Hours of Delay (Thousands)	629	899	10,132
Percent Delay	10% (6 minutes/hour)	11% (7 minutes/hour)	52% (32 minutes/hour)
Speed (mph):			
All Facilities	35	36	19
Freeways	47	45	24
Miles of Congestion:			
AM Peak	452	280	2,564
PM Peak	856	612	4,567
Transit Mode Split			
Home-to-Work	6.58%	19.3%	5.10%
Average Auto Occupancy			
Home-to-Work	1.129	1.186	1.150
AIR QUALITY			
On-Road Mobile Source Emissions (tons/day)			
ROG	698	231	345
NOx	899	281	618
SOx	34	36	54
PM-10	41	44	62
CO	5,417	2,259	4,066
ENERGY			
Fuel Consumption (million gal/day)			
Gasoline	13.8	13.5	22.7
Diesel	2.0	1.7	2.9
GEOLOGY/SEISMICITY			
Added Highway Lanes Intersecting Faults	N/A	160	8
New Rail Corridors Intersecting Faults	N/A	23	2
NATURAL RESOURCES			
Expanded Highway Facilities in Urbanizing Areas	N/A	1,490	176

ALTERNATIVES EVALUATION MATRIX

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
339,481	325,173	281,226	304,594
9,172	8,578	7,779	8,556
1,153	849	895	1,300
13% (8 minutes/hour)	10% (6 minutes/hour)	11% (7 minutes/hour)	15% (9 minutes/hour)
37 48	38 50	36 45	36 42
676 1,063	403 752	220 611	525 1,042
7.64%	7.42%	19.40%	19.45%
1.202	1.201	1.187	1.187
244 523 38 53 3,013	238 508 37 51 2,958	218 440 32 44 2,732	226 465 34 47 2,800
16.0 2.1	15.3 2.0	13.4 1.7	14.4 1.9
330	260	96	144
17	12	14	14
1,771	1,567	895	900

Table 27:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
VISUAL RESOURCES/ AESTHETICS			
Miles of Elevated Highways	N/A	20	0
Parks and Designated Natural Areas Subject to Intrusion by Added Highway Facilities	N/A	57	0
NOISE			
Lane Miles of Added Highway Facilities:			
-in Urban Areas	N/A	2,500	330
-in Non-urban Areas	N/A	133	80
REGIONAL ECONOMY			
Annual Cost of Congestion ($1987, billions)	$1.8	$2.6	$26.3
Annual Personal Vehicle Costs ($1987, billions)	$15.7	$19.9	$26.6
Commuter Flow Efficiencies:			
Average Home-to-Work Trip Length (miles)	10.7	11.1	12.4
Average Home-Work Trip Time (minutes)	19	19	40
Average Home-Work Trip Speed (mph)	34	36	19
SOCIAL IMPACTS			
Potential Displacements Associated With At-Grade Expansion of Existing Highways			
Acres (12'/lane)	N/A	3,670	N/A
Dwelling Units (6/acre)	N/A	22,170	N/A
Persons (2.5/unit)	N/A	55,670	N/A
Acres Subject to Construction Impacts (within 100 feet of new highway construction)	N/A	21,340	N/A
Transit Availability:			
Miles of Rail -- Heavy and Light Rail	N/A	360	42

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
460	400	12	25
55	57	34	41
6,800	5,700	1,500	2,300
340	140	80	90
$9.3	$6.7	$2.6	$3.7
$24.0	$23.0	$19.9	$21.6
12.3	11.1	11.1	12.3
21	18	19	21
36	37	36	35
6,000	5,400	2,200	3,400
35,700	32,100	13,300	20,400
89,200	80,360	33,400	50,900
22,700	22,300	12,800	14,400
367	294	397	497

Table 27:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
SOCIAL IMPACTS -- REGIONAL LEVEL			
Changes in Real and Perceived Attractiveness of the Region	Increasing congestion during peak hours	Job Housing Balance: Could promote development of additional commercial centers Demand Management: TDM (parking costs, tolls, etc.) could deter businesses and workforce from remaining in or relocating to the region	Unrelieved congestion could deter business and experienced workforce from relocating to or remaining in the region
SOCIAL IMPACTS -- COMMUNITY LEVEL			
Use of Local Streets (Non-Arterial) During Peak Commute Periods	Increasing use of local streets during commute period	Job/Housing Balance: Would promote dispersion of commercial and social facilities closer to residential areas Demand Management: Additional reduction in commuter use of local streets (reduced trips)	Unrelieved congestion could result in heavy use of local streets and neighborhood disruption
Changes in Use of Community and Local Facilities	N/A	Demand Management: Could promote demand for service-oriented facilities closer to residential areas for homeworkers and/or extended hours of service for flextime/staggered schedules Higher parking costs in CBD or other central areas, could affect retail activities Job/Housing Balance: Same as Strategy 2	Arterial congestion could adversely affect local commercial areas
SOCIAL IMPACTS -- EMPLOYMENT LEVEL			
Changes in Workplace	Increasing congestion creates problems for business transactions	Demand Management: Modified Work Week encourages: o transit use/car pools o job sharing o written communication o increased productivity May create problems for: o business administration (e.g. employee benefits) o communication between workers/other businesses Job/Housing Balance: Similar to Strategy 2	Unrelieved congestion could increase worker tardiness, increase delivery costs, reduce customer/client interaction

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
Availability of transit & increased mobility could enhance the image of the region	Facility Construction: Additional facilities could enhance image of region as in Strategy 1 Job Housing Balance: Could promote development of additional commercial centers within the region	Job/Housing Balance: Same as Strategy 2 Demand Management: Mobility restrictions (e.g. parking costs, tolls, etc.) could deter businesses and experienced workforce from remaining in or relocating to the region	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Local street use reduced significantly - less neighborhood disruption	Facility Construction: Same as Strategy 1 Job/Housing Balance: potential for increased commercial traffic on arterials in predominately residential areas	Job/Housing Balance: Same as Strategy 2 Demand Management: Additional reduction in commuter use of local streets (reduced trips)	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Increased access to local and regional facilities	Job/Housing Balance: Would promote dispersion of commercial and social facilities closer to residential areas Facility Construction: Same as Strategy 1	Demand Management: Could promote demand for service-oriented facilities closer to residential areas for homeworkers and/or extended hours of service for flextime/staggered schedules Higher parking costs in CBD or other central areas, could affect retail activities Job/Housing Balance: Same as Strategy 2	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3
Increased opportunity for smoother business operations and customer/client interaction compared to No Project	Facility Construction: Same as Strategy 1 Job/Housing Balance: Also could isolate businesses from city center Reduces interaction between businesses	Demand Management: Modified Work Week encourages: o transit use/car pools o job sharing o written communication o increased productivity May creates problems for: o business administration (e.g. employee benefits) o communication between workers/other businesses Job/Housing Balance: Similar to Strategy 2	Facility Construction: Similar to Strategy 1 Demand Management: Same as Strategy 3

Table 27:

Evaluation Criteria	1984 Base	2010-Proposed Project	2010-No Project
SOCIAL IMPACTS -- PERSONAL LEVEL			
Changes in Lifestyle	Increasing congestion reduces personal time	Job/Housing Balance: Shortened commute for some Increases opportunities for business involvement in civic issues and projects Demand Management: Shift in normal work week may: o alter use of commercial and recreational facilities o reduce social contact o reduce stress of commuting o increase parenting opportunities o increase leisure time Demand management financing mechanisms (e.g. parking costs, tolls) could reduce non-work trips	Increased tension due to congestion delays and longer trip times, reduced leisure time

ALTERNATIVES EVALUATION MATRIX (continued)

Mobility Strategy-1	Mobility Strategy-2	Mobility Strategy-3	Mobility Strategy-4
Reduced tension due to fewer delays and shorter trip times compared to No Project May encourage longer home-to-work commute patterns	Facility Construction: Tension reduction same as Strategy 1 Job/Housing Balance: Shortened commute for some Increases opportunities for business involvement in civic issues and projects	Job/Housing Balance: Same as Strategy 2 Demand Management: Shift in normal work week may: o alter use of commercial and recreational facilities o reduce social contact o reduce stress of commuting o increase parenting opportunities o increase leisure time Demand management financing mechanisms (e.g. parking costs, tolls) could reduce non-work trips	Facility Construction: Same as Strategy 1 Demand Management: Same as Strategy 3

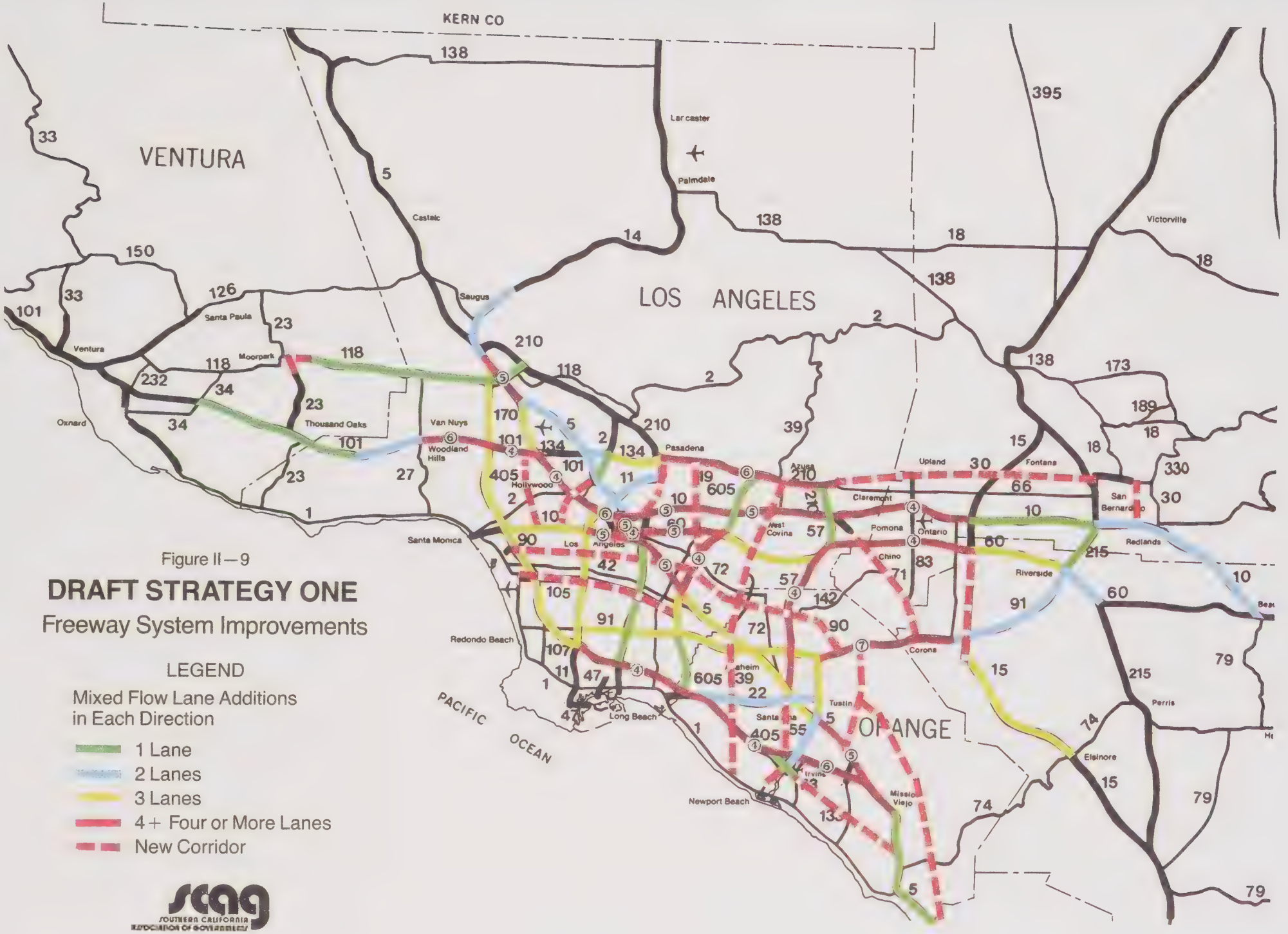

Figure II—9

DRAFT STRATEGY ONE

Freeway System Improvements

LEGEND

Mixed Flow Lane Additions in Each Direction

- 1 Lane
- 2 Lanes
- 3 Lanes
- 4+ Four or More Lanes
- New Corridor

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KERN CO
VENTURA
LOS ANGELES
ORANGE
PACIFIC OCEAN
Lancaster
Palmdale
Victorville
Castaic
Saugus
Santa Paula
Ventura
Moorpark
Oxnard
Thousand Oaks
Van Nuys
Woodland Hills
Pasadena
Azusa
Claremont
Upland
Fontana
San Bernardino
Pomona
Ontario
Chino
Riverside
Redlands
Corona
Perris
Elsinore
Santa Monica
Redondo Beach
Long Beach
Tustin
Irvine
Mission Viejo
Newport Beach
Figure II—10
DRAFT STRATEGY ONE
High Occupancy Vehicle System Improvements
LEGEND
High Occupancy Vehicle Lane Additions in Each Direction
1 HOV Lane
2 HOV Lanes
3 HOV Lanes
New Corridor
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VENTURA
LOS ANGELES
ORANGE
PACIFIC OCEAN
Lancaster
Palmdale
Castaic
Saugus
Santa Paula
Ventura
Oxnard
Thousand Oaks
Woodland Hills
Van Nuys
Hollywood
Pasadena
Santa Monica
Redondo Beach
Long Beach
Anaheim
Santa Ana
Tustin
Irvine
Newport Beach
Mission Viejo
Laguna
Diamond Bar
West Covina
Pomona
Ontario
Chino
Upland
Fontana
Victorville
San Bernardino
Redlands
Riverside
Corona
Perris
Elsinore
Beaumont
Figure II—11
DRAFT STRATEGY ONE
Rapid Transit System
LEGEND
Type of Rail Service
Light Rail
Heavy Rail
Commuter Rail
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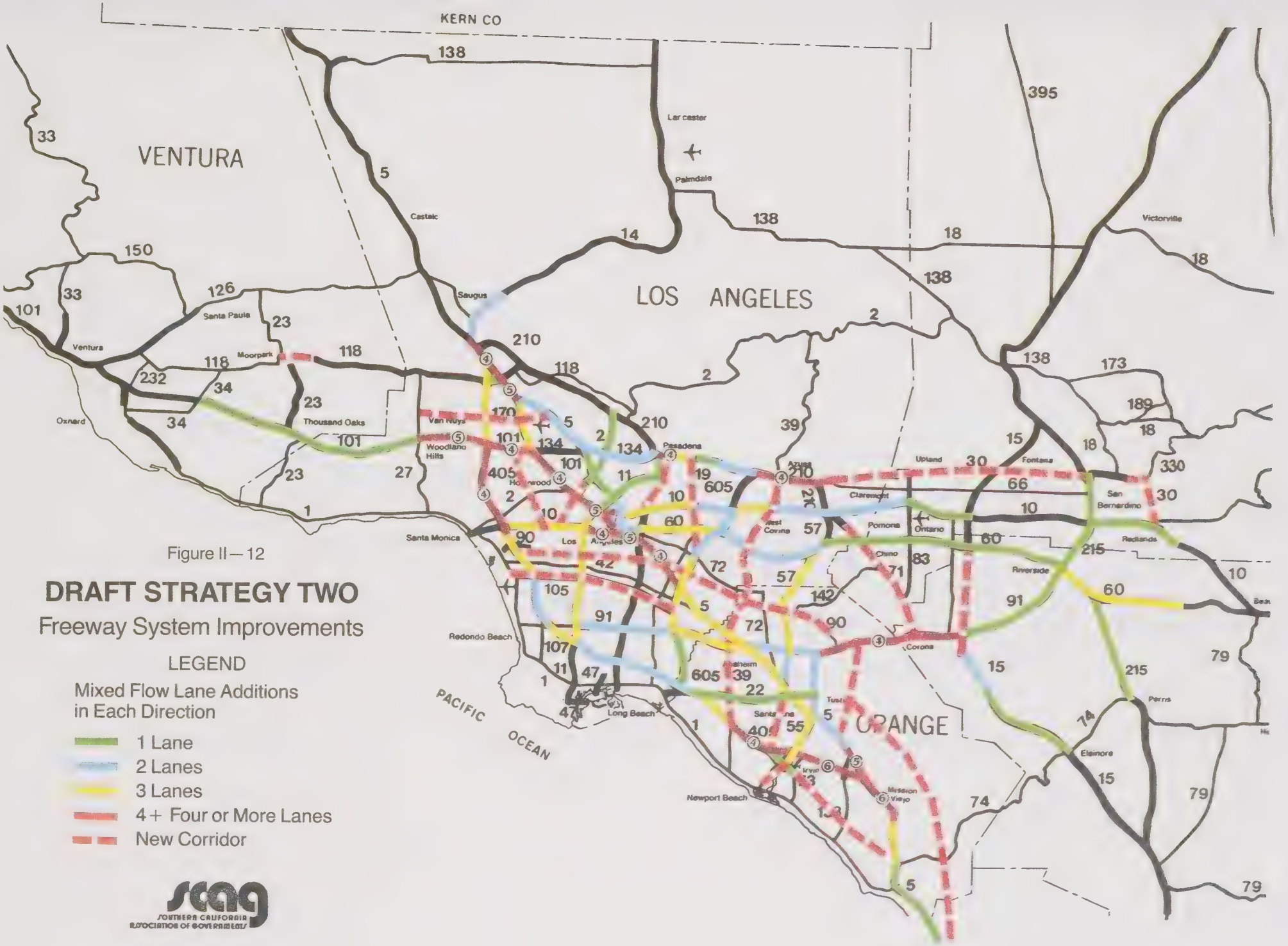

Figure II—12

DRAFT STRATEGY TWO

Freeway System Improvements

LEGEND

Mixed Flow Lane Additions in Each Direction

- 1 Lane
- 2 Lanes
- 3 Lanes
- 4+ Four or More Lanes
- New Corridor

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Lancaster
Palmdale
Castaic
Saugus
Santa Paula
Ventura
Moorpark
Oxnard
Thousand Oaks
Van Nuys
Woodland Hills
Pasadena
Santa Monica
Redondo Beach
Long Beach
Tustin
Irvine
Newport Beach
Mission Viejo
Corona
Riverside
Ontario
Pomona
Claremont
Upland
Fontana
San Bernardino
Redlands
Perris
Elsinore
Victorville
Figure II—13
DRAFT STRATEGY TWO
High Occupancy Vehicle System Improvements
LEGEND
High Occupancy Vehicle Lane Additions in Each Direction
1 HOV Lane
2 HOV Lanes
3 HOV Lanes
New Corridor
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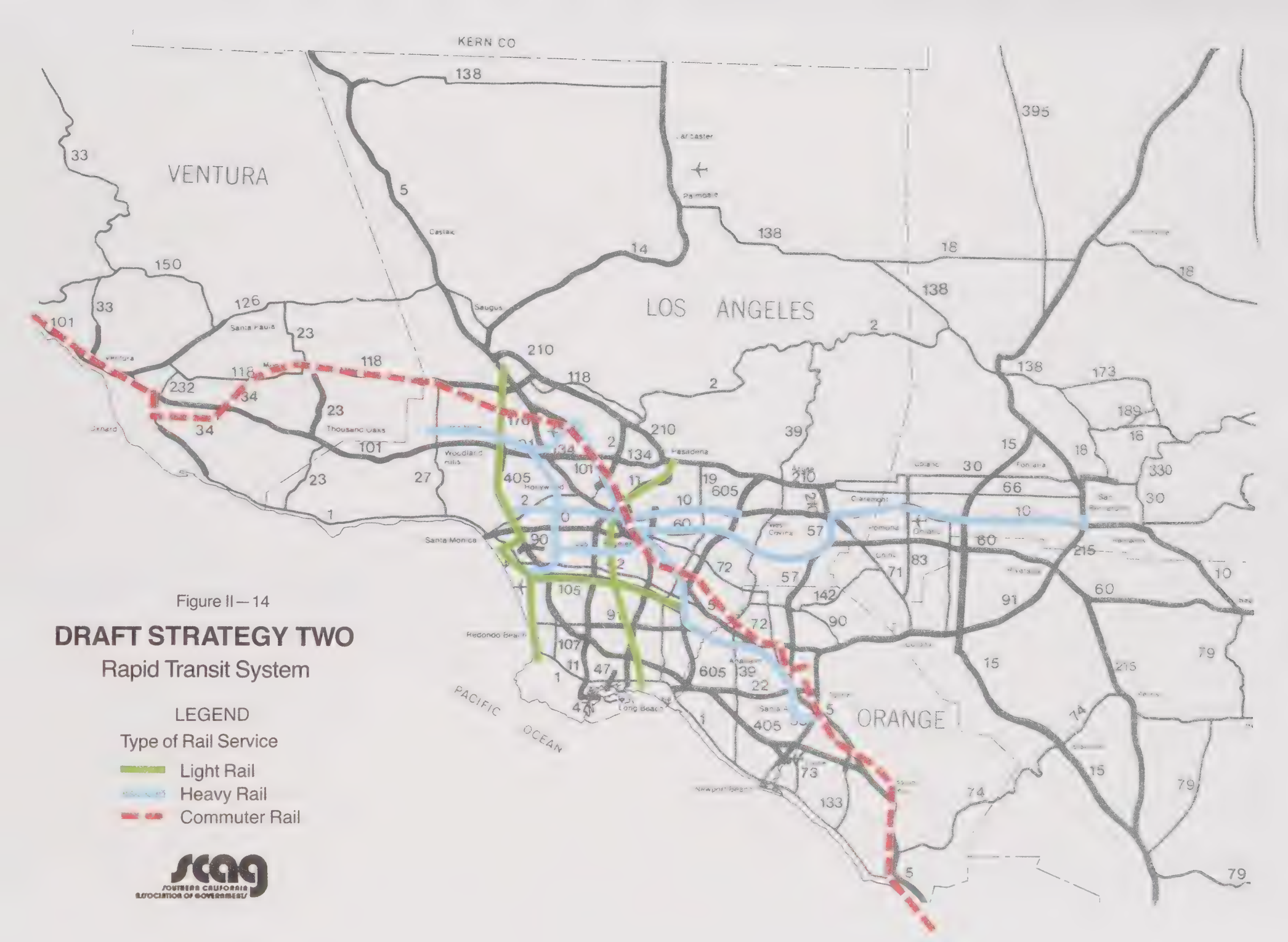
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PACIFIC OCEAN
Santa Paula
Thousand Oaks
Woodland Hills
Santa Monica
Pasadena
Redondo Beach
Long Beach
Newport Beach
Saugus
Castaic
Palmdale
Lancaster
Figure II—14
DRAFT STRATEGY TWO
Rapid Transit System
LEGEND
Type of Rail Service
Light Rail
Heavy Rail
Commuter Rail
SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

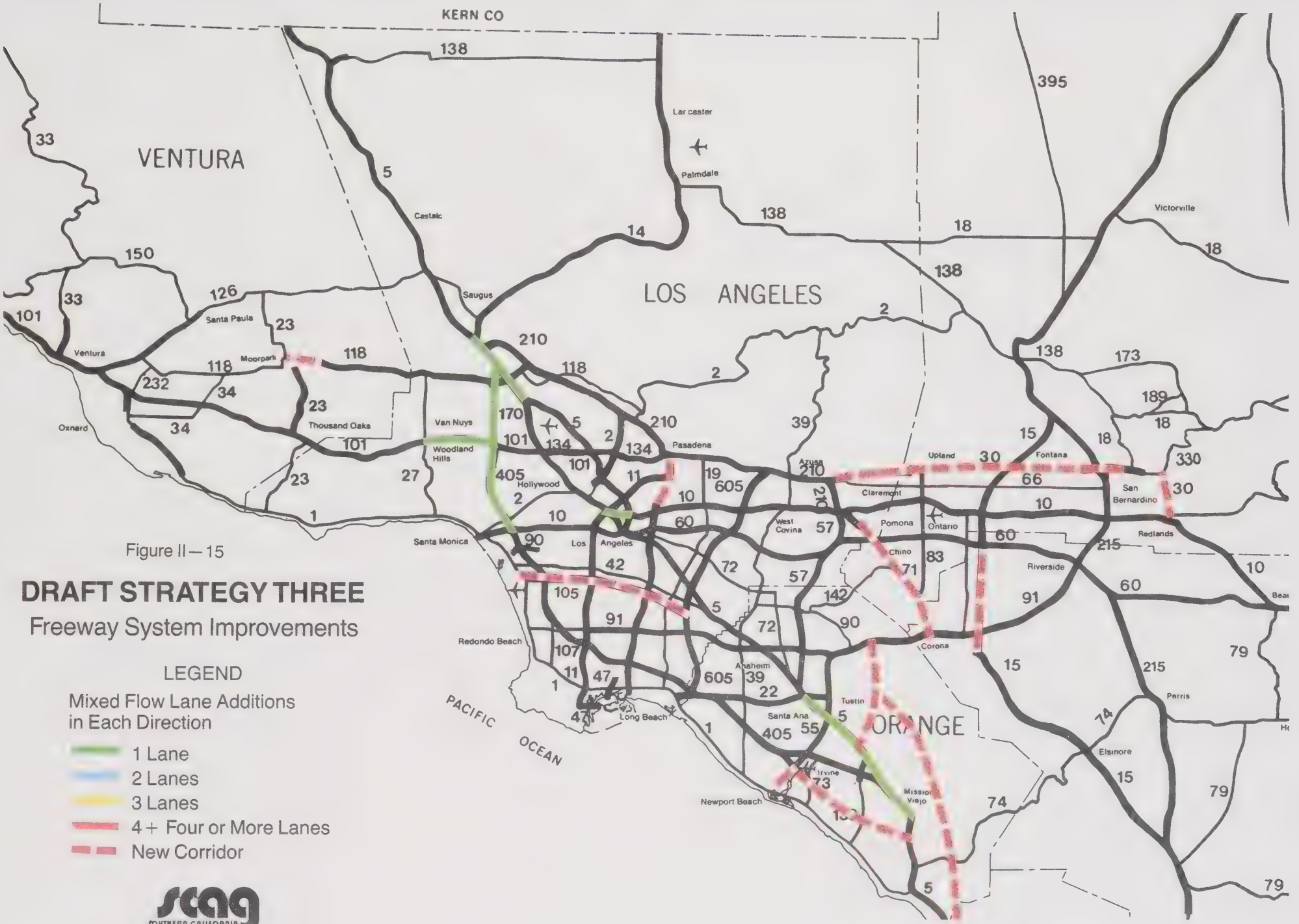

Figure II—15

DRAFT STRATEGY THREE

Freeway System Improvements

LEGEND

Mixed Flow Lane Additions in Each Direction

- 1 Lane
- 2 Lanes
- 3 Lanes
- 4+ Four or More Lanes
- New Corridor

SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Figure II—16

DRAFT STRATEGY THREE

High Occupancy Vehicle System Improvements

LEGEND

High Occupancy Vehicle Lane Additions in Each Direction

- 1 HOV Lane
- 2 HOV Lanes
- 3 HOV Lanes
- New Corridor

SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

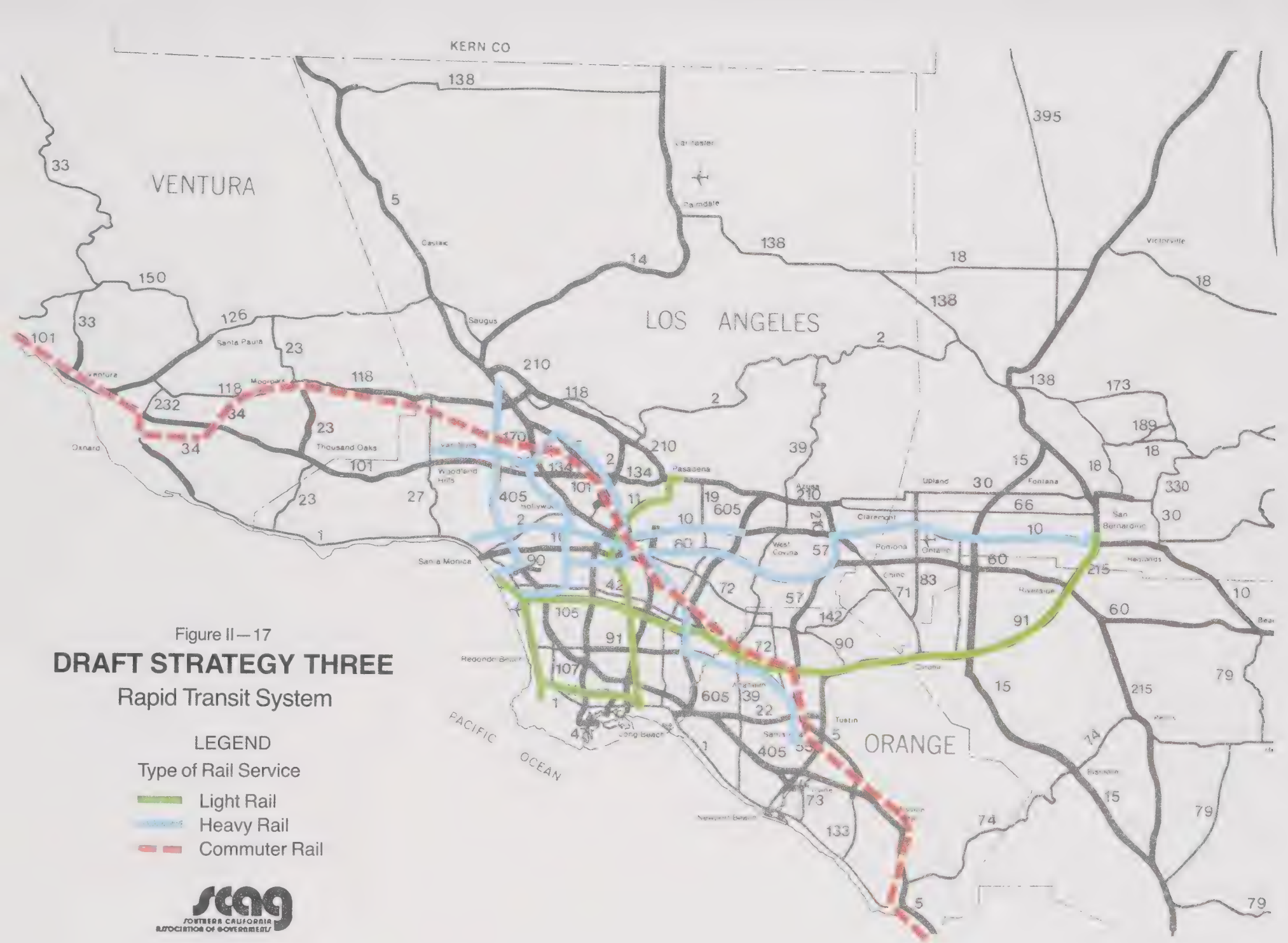
KERN CO
VENTURA
LOS ANGELES
ORANGE
PACIFIC OCEAN
Figure II—17
DRAFT STRATEGY THREE
Rapid Transit System
LEGEND
Type of Rail Service
Light Rail
Heavy Rail
Commuter Rail
SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Figure II—18

DRAFT STRATEGY FOUR
Freeway System Improvements

LEGEND

Mixed Flow Lane Additions in Each Direction

- 1 Lane
- 2 Lanes
- 3 Lanes
- 4+ Four or More Lanes
- New Corridor

SCAG
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS

Figure II—19

DRAFT STRATEGY FOUR
High Occupancy Vehicle System Improvements

LEGEND

High Occupancy Vehicle Lane Additions in Each Direction

- 1 HOV Lane
- 2 HOV Lanes
- 3 HOV Lanes
- New Corridor

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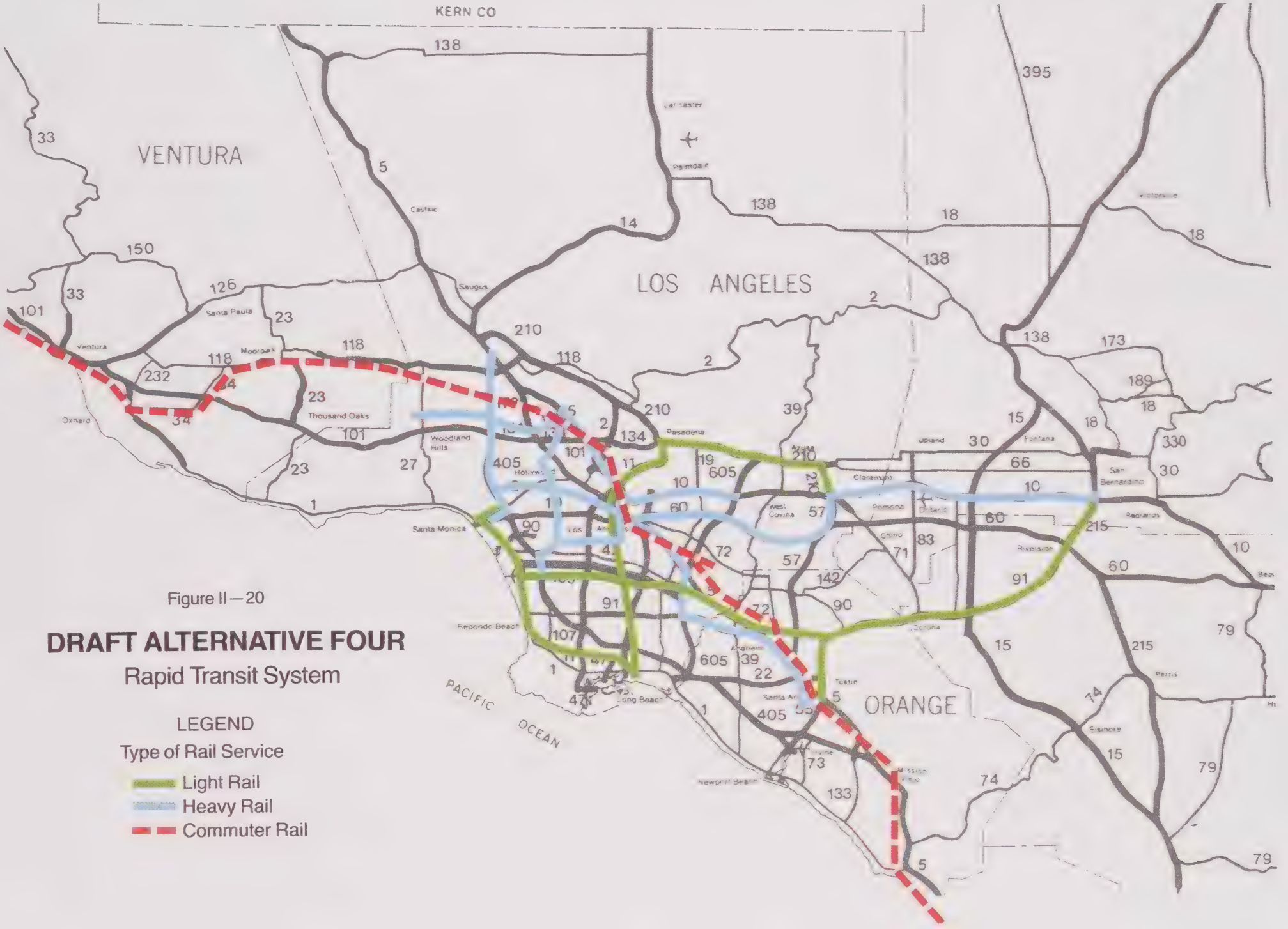

Figure II—20

DRAFT ALTERNATIVE FOUR

Rapid Transit System

LEGEND

Type of Rail Service

- Light Rail
- Heavy Rail
- Commuter Rail

7. Notice of Preparation

7. NOTICE OF PREPARATION

The following pages present the CEQA-required Notice of Preparation (NOP) for this Environmental Impact Report, which was filed with the State Clearinghouse and appropriate Environmental Review agencies December 21, 1987, establishing the file number for this EIR as SCH 87-121613.

The following parties responded to the NOP; some offered comments on the scope of the EIR, which have been included in the EIR analysis as appropriate:

Mr. Gary Spivack
SCRTD
425 South Main Street
Los Angeles, CA 90013

Mr. Michael L. Sowby
LA Regional Water Quality Control Board
107 S Broadway, Suite 4027
Los Angeles, CA 90012

Mr. Guy Visbal
Caltrans District 08
PO Box 231
San Bernardino, CA 92402

Mr. Jim Sims
LACTC
403 W Eighth St, Suite 500
Los Angeles, CA 90014

Mr. Robert L. Braitman
Attn: Ms. Lynne W. Kada
Ventura County LAFCO
800 South Victoria Av
Ventura, CA 93009

Mr. Michael M. Ruane
Orange County EMA
PO Box 4048
Santa Ana, CA 92702

Mr. Victor R. Husbands
Ventura County RMA
800 South Victoria Avenue
Ventura, CA 93009

SOUTHERN CALIFORNIA
ASSOCIATION OF GOVERNMENTS
600 South Commonwealth Avenue • Suite 1000 • Los Angeles • California • 90005 • 213/385-1000

NOTICE OF PREPARATION

TO: Mr. Keith Lee
Office of Planning & Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, CA 95814

FROM: Southern California Association of Governments
600 S. Commonwealth Ave., Ste. 1000
Los Angeles, CA 90005

SUBJECT: NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

The Southern California Association of Governments (SCAG) will be the Lead Agency and will prepare an environmental impact report for the project identified below. We need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project.

The project description, location, and the probable environmental effects are described below. A copy of the Initial Study ___ is, _X_ is not, attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Joanne Freilich at the address shown above. We will need the name for a contact person in your agency.

Project Title: Draft 1988 Regional Mobility Plan

Project Location: SCAG Region: Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura

Project Description: The purpose of the Regional Mobility Plan is to provide for the mobility needs of the region through the year 2010. The region is projected to undergo significant population and economic growth during this period. The Plan will include three systemwide Mobility Plan Alternatives. Alternative 1 is designed to achieve mobility objectives by building necessary facilities and, where appropriate, complementary demand management and system management strategies. The emphasis is on adding capacity to meet projected needs. Alternative 2 is similar to Alternative 1, emphasizing facility development in combination with increased balancing of housing and jobs within

the region and various demand management techniques. Alternative 3 is designed to achieve mobility objectives through demand management (including better job/housing balance) and system management and by building selected facilities where needs are not met by these strategies.

Potential Environmental Effects: The following subject areas will be examined for potential regional impacts: air quality, energy, geology/seismicity, biological resources, water resources, visual/aesthetic, noise, cultural resources, social, mobility, population growth and urban form, and regional economy.

DATE: December 9, 1987

Signature Anne Freilich

Title Principal Planner

Telephone (213) 385-1000

8. Notice of Completion

8. NOTICE OF COMPLETION

State of California
Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

Project Title: SCAG 1988 Regional Mobility Plan
Project Location: Six-County SCAG Region.
Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

Project Description: The Regional Mobility Plan for the SCAG region sets policy on transportation improvements and programs; identifies implementation actions and agencies to carry out the actions; and defines a financial program to raise needed revenues through the year 2010 for the six counties of the SCAG region. Elements include the following: Growth Management to promote job/housing balance; Transportation Demand Management; Transportation System Management; construction of facilities for High-Occupancy Vehicles, Mixed-Flow and Transit; Port and Aviation Improvements; and Financing.

Lead Agency: Southern California Association of Governments (SCAG)
EIR Available at: SCAG, 600 South Commonwealth Avenue, Suite 1000
Los Angles, CA 90005
Review Period: October 18 - November 18, 1988.
Contact Person: Mr. Paul H. Hatanaka, Principal, SCAG Environmental Planning
(213) 385-1000

9. Appendix: Data Tables

9. APPENDIX: DATA TABLES

Table 28

1984 - BASE YEAR SOCIO-ECONOMIC DATA

COUNTY	POP	SDU	MDU	DU	0-VEH	RET	EMP	VEH	LIC-DR	WKR	INC
LOS ANGELES	7858373	1498323	1460302	2958625	399800	599556	3979546	4777588	5015341	3504321	$8,875
ORANGE	2066402	415135	345362	760497	58918	187326	1039601	1434139	1518085	1035595	$10,982
RIVERSIDE [a]	573889	160458	55447	215905	24465	31243	157307	366902	375454	209038	$7,959
SAN BERNARDINO [a]	822408	213311	80738	294049	32100	50656	253198	505921	539875	326003	$8,879
VENTURA	579485	128913	69082	197995	16188	34156	200295	386227	396692	249280	$10,074
URBAN REGION [a]	**11900557**	**2416140**	**2010931**	**4427071**	**531471**	**902937**	**5629947**	**7470777**	**7845447**	**5324237**	**$9,246**

COUNTY	POP/DU	DU/ACRE	%-MDU	VEH/DU	%-0-VEH	LD/DU	EMP/ACRE	DU/EMP	%-RET	WKR/DU	WKR/EMP
LOS ANGELES	2.66	1.17	49.4%	1.61	8.4%	1.70	1.57	0.74	15.1%	1.18	0.88
ORANGE	2.72	1.47	45.4%	1.89	4.1%	2.00	2.01	0.73	18.0%	1.36	1.00
RIVERSIDE [a]	2.66	0.21	25.7%	1.70	6.7%	1.74	0.15	1.37	19.9%	0.97	1.33
SAN BERNARDINO [a]	2.80	0.31	27.5%	1.72	6.3%	1.84	0.26	1.16	20.0%	1.11	1.29
VENTURA	2.93	0.17	34.9%	1.95	4.2%	2.00	0.17	0.99	17.1%	1.26	1.24
URBAN REGION [a]	**2.69**	**0.71**	**45.4%**	**1.69**	**7.1%**	**1.77**	**0.90**	**0.79**	**16.0%**	**1.20**	**0.95**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County (see Table 15).

POP = Resident Population, including Group Quarters;
SDU = Single-Dwelling Units;
MDU = Multiple-Dwelling Units, including Group Quarters;
DU = SDU + MDU;
0-Veh = Dwelling Units with No Vehicles Owned;
RET = Retail Employment (by place of employment);
EMP = Total Employment (by place of employment);
VEH = Total Vehicles Owned;
LIC-DR = Licensed Drivers;
WKR = Workers (by place of residence);
INC = Household Income, $1967 (mean weighted by DU).

POP/DU = Household Size;
DU/ACRE = Dwelling Unit Density;
%-MDU = Percent Multiple Dwelling Units;
VEH/DU = Vehicle Ownership;
%-0-VEH = Households with No Vehicle;
LD/DU = Licensed Drivers per Household;
EMP/ACRE = Employment Density;
DU/EMP = Housing/Job Balance;
%-RET = Percent Retail Employment;
WKR/DU = Workers per Household;
WKR/EMP = Worker (by place-of-residence)/Job Balance.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988. (Summary of 1,285 analysis zones.)

(continued)

Table 28 (continued)

GMA-4-MJH - YEAR 2010 PROPOSED PLAN SOCIO-ECONOMIC DATA

COUNTY	POP	SDU	MDU	DU	0-VEH	RET	EMP	VEH	LIC-DR	WKR	INC
LOS ANGELES	10231202	1896990	2083127	3980117	492983	827294	5415207	6019431	6760203	5170185	$9,903
ORANGE	2982198	606979	567725	1174704	100509	292552	1691799	2088456	2222025	1741212	$12,021
RIVERSIDE [a]	1389698	394012	155324	549336	71203	79425	444397	887299	744854	560325	$8,418
SAN BERNARDINO [a]	1747597	463597	208726	672323	80359	120718	669202	1040406	1036492	790145	$9,767
VENTURA	915204	196066	133299	329365	24811	67348	365598	562903	583765	454717	$11,172
URBAN REGION [a]	**17265899**	**3557644**	**3148201**	**6705845**	**769865**	**1387337**	**8586203**	**10598495**	**11347339**	**8716584**	**$10,201**

GMA-1 - YEAR 2010 REVISED BASELINE SOCIO-ECONOMIC DATA

COUNTY	POP	SDU	MDU	DU	0-VEH	RET	EMP	VEH	LIC-DR	WKR	INC
LOS ANGELES	9944196	1833560	2023771	3857331	477400	838002	5523335	5833758	6575327	5029487	$9,922
ORANGE	3052649	623005	582596	1205601	103398	329826	1918965	2143365	2273671	1779488	$12,077
RIVERSIDE [a]	1489451	427365	164746	592111	76585	63796	353864	956390	793057	590586	$8,266
SAN BERNARDINO [a]	1748705	460156	209089	669245	78883	98028	548601	1035673	1035872	801588	$9,923
VENTURA	909153	196657	132896	329553	25881	61545	339965	563216	582819	450702	$10,699
URBAN REGION [a]	**17144154**	**3540743**	**3113098**	**6653841**	**762147**	**1391197**	**8684730**	**10532402**	**11260746**	**8651851**	**$10,204**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County (see Table 15).

POP = Resident Population, including Group Quarters;
SDU = Single-Dwelling Units;
MDU = Multiple-Dwelling Units, including Group Quarters;
DU = SDU + MDU;
0-Veh = Dwelling Units with No Vehicles Owned;
RET = Retail Employment (by place of employment);
EMP = Total Employment (by place of employment);
VEH = Total Vehicles Owned;
LIC-DR = Licensed Drivers;
WKR = Workers (by place of residence);
INC = Household Income, $1967 (mean weighted by DU).

POP/DU = Household Size;
DU/ACRE = Dwelling Unit Density;
%-MDU = Percent Multiple Dwelling Units;
VEH/DU = Vehicle Ownership;
%-0-VEH = Households with No Vehicle;
LD/DU = Licensed Drivers per Household;
EMP/ACRE = Employment Density;
DU/EMP = Housing/Job Balance;
%-RET = Percent Retail Employment;
WKR/DU = Workers per Household;
WKR/EMP = Worker (by place-of-residence)/Job Balance.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988. (Summary of 1,285 analysis zones.)

(continued)

Table 28 (continued)

YEAR 2010 GMA-4MJH - YEAR 2010 PROPOSED PLAN SOCIO-ECONOMIC DATA

COUNTY	POP/DU	DU/ACRE	%-MDU	VEH/DU	%-0-VEH	LD/DU	EMP/ACRE	DU/EMP	%-RET	WKR/DU	WKR/EMP
LOS ANGELES	2.57	1.57	52.3%	1.51	8.2%	1.70	2.13	0.73	15.3%	1.30	0.95
ORANGE	2.54	2.27	48.3%	1.78	4.8%	1.89	3.27	0.69	17.3%	1.48	1.03
RIVERSIDE [a]	2.53	0.53	28.3%	1.62	8.0%	1.36	0.43	1.24	17.9%	1.02	1.26
SAN BERNARDINO [a]	2.60	0.70	31.0%	1.55	7.7%	1.54	0.69	1.00	18.0%	1.18	1.18
VENTURA	2.78	0.28	40.5%	1.71	4.4%	1.77	0.31	0.90	18.4%	1.38	1.24
URBAN REGION [a]	**2.57**	**1.08**	**46.9%**	**1.58**	**7.3%**	**1.69**	**1.38**	**0.78**	**16.2%**	**1.30**	**1.02**

GROWTH OVER 1984

COUNTY	POP	SDU	MDU	DU	0-VEH	RET	EMP	VEH	LIC-DR	WKR	INC
LOS ANGELES	30.2%	26.6%	42.7%	34.5%	23.3%	38.0%	36.1%	26.0%	34.8%	47.5%	11.6%
ORANGE	44.3%	46.2%	64.4%	54.5%	70.6%	56.2%	62.7%	45.6%	46.4%	68.1%	9.5%
RIVERSIDE [a]	142.2%	145.6%	180.1%	154.4%	191.0%	154.2%	182.5%	141.8%	98.4%	168.0%	5.8%
SAN BERNARDINO [a]	112.5%	117.3%	158.5%	128.6%	150.3%	138.3%	164.3%	105.6%	92.0%	142.4%	10.0%
VENTURA	57.9%	52.1%	93.0%	66.4%	53.3%	97.2%	82.5%	45.7%	47.2%	82.4%	10.9%
URBAN REGION [a]	**45.1%**	**47.2%**	**56.6%**	**51.5%**	**44.9%**	**53.6%**	**52.5%**	**41.9%**	**44.6%**	**63.7%**	**10.3%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County (see Table 15).

POP = Resident Population, including Group Quarters;
SDU = Single-Dwelling Units;
MDU = Multiple-Dwelling Units, including Group Quarters;
DU = SDU + MDU;
0-Veh = Dwelling Units with No Vehicles Owned;
RET = Retail Employment (by place of employment);
EMP = Total Employment (by place of employment);
VEH = Total Vehicles Owned;
LIC-DR = Licensed Drivers;
WKR = Workers (by place of residence);
INC = Household Income, $1967 (mean weighted by DU).

POP/DU = Household Size;
DU/ACRE = Dwelling Unit Density;
%-MDU = Percent Multiple Dwelling Units;
VEH/DU = Vehicle Ownership;
%-0-VEH = Households with No Vehicle;
LD/DU = Licensed Drivers per Household;
EMP/ACRE = Employment Density;
DU/EMP = Housing/Job Balance;
%-RET = Percent Retail Employment;
WKR/DU = Workers per Household;
WKR/EMP = Worker (by place-of-residence)/Job Balance.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988. (Summary of 1,285 analysis zones.)

(continued)

Table 28 (continued)

YEAR 2010 GMA-1 - YEAR 2010 REVISED BASELINE SOCIO-ECONOMIC DATA

COUNTY	POP/DU	DU/ACRE	%-MDU	VEH/DU	%-0-VEH	LD/DU	EMP/ACRE	DU/EMP	%-RET	WKR/DU	WKR/EMP
LOS ANGELES	2.58	1.52	52.5%	1.51	8.2%	1.70	2.18	0.70	15.2%	1.30	0.91
ORANGE	2.53	2.33	48.3%	1.78	4.8%	1.89	3.71	0.63	17.2%	1.48	0.93
RIVERSIDE [a]	2.52	0.57	27.8%	1.62	8.0%	1.34	0.34	1.67	18.0%	1.00	1.67
SAN BERNARDINO [a]	2.61	0.69	31.2%	1.55	7.6%	1.55	0.57	1.22	17.9%	1.20	1.46
VENTURA	2.76	0.28	40.3%	1.71	4.6%	1.77	0.29	0.97	18.1%	1.37	1.33
URBAN REGION [a]	**2.58**	**1.07**	**46.8%**	**1.58**	**7.2%**	**1.69**	**1.39**	**0.77**	**16.0%**	**1.30**	**1.00**

GROWTH OVER 1984

COUNTY	POP	SDU	MDU	DU	0-VEH	RET	EMP	VEH	LIC-DR	WKR	INC
LOS ANGELES	26.5%	22.4%	38.6%	30.4%	19.4%	39.8%	38.8%	22.1%	31.1%	43.5%	11.8%
ORANGE	47.7%	50.1%	68.7%	58.5%	75.5%	76.1%	84.6%	49.5%	49.8%	71.8%	10.0%
RIVERSIDE [a]	159.5%	166.3%	197.1%	174.2%	213.0%	104.2%	125.0%	160.7%	111.2%	182.5%	3.9%
SAN BERNARDINO [a]	112.6%	115.7%	159.0%	127.6%	145.7%	93.5%	116.7%	104.7%	91.9%	145.9%	11.8%
VENTURA	56.9%	52.6%	92.4%	66.4%	59.9%	80.2%	69.7%	45.8%	46.9%	80.8%	6.2%
URBAN REGION [a]	**44.1%**	**46.5%**	**54.8%**	**50.3%**	**43.4%**	**54.1%**	**54.3%**	**41.0%**	**43.5%**	**62.5%**	**10.4%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County (see Table 15).

POP = Resident Population, including Group Quarters;
SDU = Single-Dwelling Units;
MDU = Multiple-Dwelling Units, including Group Quarters;
DU = SDU + MDU;
0-Veh = Dwelling Units with No Vehicles Owned;
RET = Retail Employment (by place of employment);
EMP = Total Employment (by place of employment);
VEH = Total Vehicles Owned;
LIC-DR = Licensed Drivers;
WKR = Workers (by place of residence);
INC = Household Income, $1967 (mean weighted by DU).

POP/DU = Household Size;
DU/ACRE = Dwelling Unit Density;
%-MDU = Percent Multiple Dwelling Units;
VEH/DU = Vehicle Ownership;
%-0-VEH = Households with No Vehicle;
LD/DU = Licensed Drivers per Household;
EMP/ACRE = Employment Density;
DU/EMP = Housing/Job Balance;
%-RET = Percent Retail Employment;
WKR/DU = Workers per Household;
WKR/EMP = Worker (by place-of-residence)/Job Balance.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988. (Summary of 1,285 analysis zones.)

Table 29

DEMAND MANAGEMENT STRATEGIES EFFECTS: CENTERS

Centers /	Status	Person Trips	Automobile Vehicle Trips 1-Person	2-Person	3+Person	Auto Occup	Transit	AVR
Los Angeles	W/O	1,577,682	937,590	118,129	46,866	1.205	15.78%	1.431
	W/TDM	1,104,542	388,059	70,208	25,014	1.254	45.14%	2.286
Orange	W/O	462,056	343,799	32,325	11,829	1.153	3.21%	1.190
	W/TDM	323,477	190,315	27,001	9,647	1.213	14.90%	1.430
Riverside*	W/O	85,396	68,646	4,500	1,653	1.111	2.65%	1.140
	W/TDM	59,811	32,061	5,756	2,040	1.257	16.20%	1.500
S Bernardino*	W/O	267,048	213,190	15,021	5,475	1.118	2.16%	1.140
	W/TDM	186,959	102,431	17,522	6,033	1.246	16.03%	1.480
Ventura	W/O	111,716	87,335	6,762	2,434	1.127	2.62%	1.160
	W/TDM	78,185	46,418	7,783	2,687	1.243	9.56%	1.370
URBAN REGION*	W/O	2,503,898	1,650,560	176,737	68,257	1.176	10.97%	1.321
	W/TDM	1,752,974	759,284	128,270	45,421	1.242	33.88%	1.879
		Change Attributable to RMP Measures						
Los Angeles	NET	-473140	-549531	-47921	-21852	0.049	29.36%	0.855
	DELTA	-30.0%	-58.6%	-40.6%	-46.6%	4.0%	185.99%	59.7%
Orange	NET	-138579	-153484	-5324	-2182	0.060	11.69%	0.240
	DELTA	-30.0%	-44.6%	-16.5%	-18.4%	5.2%	364.74%	20.2%
Riverside*	NET	-25585	-36585	1256	387	0.146	13.55%	0.360
	DELTA	-30.0%	-53.3%	27.9%	23.4%	13.1%	510.34%	31.6%
S Bernardino*	NET	-80089	-110759	2501	558	0.128	13.87%	0.340
	DELTA	-30.0%	-52.0%	16.7%	10.2%	11.4%	641.81%	29.8%
Ventura	NET	-33531	-40917	1021	253	0.116	6.94%	0.210
	DELTA	-30.0%	-46.9%	15.1%	10.4%	10.3%	264.93%	18.1%
URBAN REGION*	NET	-750924	-891276	-48467	-22836	0.066	22.91%	0.558
	DELTA	-30.0%	-54.0%	-27.4%	-33.5%	5.6%	208.72%	42.2%

(continued)

Table 29 (continued)

DEMAND MANAGEMENT STRATEGIES EFFECTS: NON-CENTERS

Non-Centers/Status		Person Trips	Automobile Vehicle Trips 1-Person	2-Person	3+Person	Auto Occup	Transit	AVR
Los Angeles	W/O	4,643,582	3,390,871	327,569	119,862	1.157	4.36%	1.210
	W/TDM	3,250,291	1,937,611	218,533	79,365	1.178	19.00%	1.450
Orange	W/O	1,636,061	1,256,524	108,747	39,003	1.141	2.03%	1.170
	W/TDM	1,145,198	758,550	85,320	30,534	1.176	10.24%	1.310
Riverside*	W/O	565,439	498,159	20,150	7,288	1.070	0.53%	1.080
	W/TDM	395,781	280,100	33,499	11,610	1.181	2.98%	1.220
S Bernardino*	W/O	652,864	540,873	32,756	11,815	1.102	1.15%	1.120
	W/TDM	456,982	312,102	30,238	10,807	1.152	10.94%	1.290
Ventura	W/O	335,493	264,494	21,119	7,506	1.131	1.18%	1.140
	W/TDM	234,853	177,437	14,921	5,294	1.137	4.32%	1.190
URBAN REGION*	W/O	7,833,439	5,950,921	510,341	185,474	1.141	3.19%	1.179
	W/TDM	5,483,105	3,465,800	382,511	137,610	1.173	14.71%	1.376
		Change Attributable to RMP Measures						
Los Angeles	NET	-1393291	-1453260	-109036	-40497	0.021	14.64%	0.240
	DELTA	-30.0%	-42.9%	-33.3%	-33.8%	1.8%	335.46%	19.8%
Orange	NET	-490863	-497974	-23427	-8469	0.035	8.21%	0.140
	DELTA	-30.0%	-39.6%	-21.5%	-21.7%	3.1%	403.86%	11.9%
Riverside*	NET	-169658	-218059	13349	4322	0.111	2.45%	0.140
	DELTA	-30.0%	-43.8%	66.2%	59.3%	10.3%	462.93%	13.0%
S Bernardino*	NET	-195882	-228771	-2518	-1008	0.050	9.80%	0.170
	DELTA	-30.0%	-42.3%	-7.7%	-8.5%	4.5%	854.85%	15.2%
Ventura	NET	-100640	-87057	-6198	-2212	0.006	3.14%	0.050
	DELTA	-30.0%	-32.9%	-29.3%	-29.5%	0.5%	267.07%	4.4%
URBAN REGION*	NET	-2350334	-2485121	-127830	-47864	0.032	11.52%	0.197
	DELTA	-30.0%	-41.8%	-25.0%	-25.8%	2.8%	360.51%	16.7%

(continued)

Table 29 (continued)

DEMAND MANAGEMENT STRATEGIES EFFECTS: TOTAL CENTERS AND NON-CENTERS

Total / Status		Person Trips	Automobile Vehicle Trips 1-Person	2-Person	3+Person	Auto Occup	Transit	AVR
Los Angeles	W/O	6,221,264	4,328,461	445,698	166,728	1.168	7.26%	1.259
	W/TDM	4,354,833	2,325,670	288,741	104,379	1.191	25.63%	1.602
Orange	W/O	2,098,117	1,600,323	141,072	50,832	1.144	2.29%	1.171
	W/TDM	1,468,675	948,865	112,321	40,181	1.183	11.26%	1.334
Riverside*	W/O	650,835	566,805	24,650	8,941	1.075	0.81%	1.084
	W/TDM	455,592	312,161	39,255	13,650	1.189	4.72%	1.248
S Bernardino*	W/O	919,912	754,063	47,777	17,290	1.107	1.44%	1.123
	W/TDM	643,941	414,533	47,760	16,840	1.177	12.42%	1.344
Ventura	W/O	447,209	351,829	27,881	9,940	1.130	1.54%	1.148
	W/TDM	313,038	223,855	22,704	7,981	1.161	5.63%	1.230
URBAN REGION*	W/O	10,337,337	7,601,481	687,078	253,731	1.149	5.08%	1.210
	W/TDM	7,236,079	4,225,084	510,781	183,031	1.186	19.36%	1.471
		Change Attributable to RMP Measures						
Los Angeles	NET	-1866431	-2002791	-156957	-62349	0.024	18.37%	0.343
	DELTA	-30.0%	-46.3%	-35.2%	-37.4%	2.0%	253.06%	27.2%
Orange	NET	-629442	-651458	-28751	-10651	0.039	8.97%	0.163
	DELTA	-30.0%	-40.7%	-20.4%	-21.0%	3.4%	391.80%	13.9%
Riverside*	NET	-195243	-254644	14605	4709	0.114	3.91%	0.164
	DELTA	-30.0%	-44.9%	59.2%	52.7%	10.6%	483.47%	15.1%
S Bernardino*	NET	-275971	-339530	-17	-450	0.070	10.98%	0.221
	DELTA	-30.0%	-45.0%	-0.0%	-2.6%	6.3%	762.08%	19.7%
Ventura	NET	-134171	-127974	-5177	-1959	0.031	4.09%	0.082
	DELTA	-30.0%	-36.4%	-18.6%	-19.7%	2.7%	266.14%	7.2%
URBAN REGION*	NET	-3101258	-3376397	-176297	-70700	0.038	14.28%	0.261
	DELTA	-30.0%	-44.4%	-25.7%	-27.9%	3.3%	281.08%	21.6%

* The urban region includes only the western parts of Riverside and San Bernardino Counties, and does not include Imperial County. The analysis accounts for changes due to SCAQMD Regulation XV, and SCAG strategies of Centers Rideshare Goals, Transit Ridership Objectives, Modified Workweeks and Telecommuting.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988.

Table 30

ON-ROAD MOBILITY - SCAG URBAN REGION

1984 BASE YEAR

COUNTY	AM [b] VMT [c]	AM VHT	AM DELAY	AM SPD	AM DEL	DAILY VMT [c]	DAILY VHT	DAILY DELAY	DAILY SPD	DAILY DEL
LOS ANGELES	19,319,496	635,486	110,437	39.0	29.0%	142,289,579	4,197,931	458,197	45.7	17.0%
	54.2%	64.4%	40.5%	25.6	10.9%	49.0%	62.2%	41.1%	26.7	7.2%
ORANGE	5,695,542	188,079	35,012	37.9	31.0%	40,822,456	1,197,265	137,214	45.7	16.9%
	55.2%	64.2%	40.4%	26.0	11.7%	49.3%	62.1%	44.2%	27.0	8.1%
RIVERSIDE [a]	1,572,680	38,927	2,409	48.9	11.1%	12,843,292	302,689	11,233	52.2	5.0%
	52.2%	60.5%	29.3%	34.8	3.0%	45.7%	55.9%	40.2%	34.7	2.7%
SAN BERNARDINO [a]	1,851,240	49,229	2,662	50.0	9.1%	15,224,951	384,180	10,640	52.5	4.6%
	53.7%	65.2%	41.2%	31.0	3.4%	49.7%	62.1%	36.9%	31.8	1.6%
VENTURA	1,211,049	32,835	1,947	48.0	12.7%	10,111,324	261,421	11,328	50.3	8.5%
	53.2%	64.0%	23.0%	30.6	2.1%	48.0%	60.0%	21.6%	30.9	1.6%
URBAN REGION [a]	**29,650,007**	**944,556**	**152,467**	**40.1**	**27.0%**	**221,291,602**	**6,343,486**	**628,612**	**46.6**	**15.2%**
	54.2%	**64.2%**	**40.1%**	**26.5**	**10.1%**	**48.9%**	**61.8%**	**41.3%**	**27.6**	**6.6%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County.

(b) The AM-Peak period includes the hours from 6:30-8:30am for all model results except those of the Proposed Project (GMA-4MJH with Proposed System), where the AM-Peak has been doubled to 4 hours.

(c) VMT = Vehicle-miles-traveled;
VHT = Vehicle-hours-traveled;
DELAY = Added VHT due to travel at less-than-policy speeds;
%'s in VMT, VHT and DELAY columns indicate proportion on surface streets relative to freeways;
SPD = Speed (mph) - upper and lower values reflect freeway and surface-street conditions respectively;
DEL = Percent of VHT in delayed conditions on freeways and surface streets respectively.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988.

(continued)

Table 30 (continued)

ON-ROAD MOBILITY - SCAG URBAN REGION

NO-PROJECT: EXISTING-PLUS-FUNDED SYSTEM WITH 2010 BASELINE (GMA-1)

	AM [b]					DAILY				
COUNTY	VMT [c]	VHT	DELAY	SPD	DEL	VMT [c]	VHT	DELAY	SPD	DEL
LOS ANGELES	27,681,936	1,939,701	1,194,916	19.6	64.3%	207,616,970	8,704,598	3,397,191	29.7	45.9%
	54.5%	66.9%	65.4%	11.6	60.3%	45.8%	56.5%	48.8%	19.3	33.7%
ORANGE	10,744,476	1,342,902	1,049,579	7.2	86.9%	79,704,951	5,487,646	3,453,288	16.1	70.7%
	58.3%	53.6%	48.4%	8.7	70.6%	46.7%	51.9%	46.0%	13.0	55.8%
RIVERSIDE [a]	4,818,706	555,265	442,985	12.0	78.1%	37,729,723	3,139,624	2,306,494	19.2	65.0%
	58.2%	69.9%	70.5%	7.2	80.5%	44.6%	65.4%	69.4%	8.2	77.9%
SAN BERNARDINO [a]	5,030,566	491,136	359,929	17.2	68.7%	35,576,091	1,796,557	914,953	32.0	41.8%
	61.1%	76.9%	78.3%	8.1	74.7%	51.8%	70.2%	75.5%	14.6	54.8%
VENTURA	1,817,746	58,553	11,610	40.7	26.0%	15,559,288	446,702	60,122	43.5	20.9%
	55.2%	65.8%	55.2%	26.0	16.6%	48.6%	58.8%	36.0%	28.8	8.2%
URBAN REGION [a]	**50,093,430**	**4,387,557**	**3,059,019**	**14.0**	**74.6%**	**376,187,023**	**19,575,127**	**10,132,048**	**24.4**	**55.6%**
	56.3%	**64.3%**	**61.8%**	**10.0**	**67.0%**	**46.5%**	**58.0%**	**54.9%**	**15.4**	**49.0%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County.

(b) The AM-Peak period includes the hours from 6:30-8:30am for all model results except those of the Proposed Project (GMA-4MJH with Proposed System), where the AM-Peak has been doubled to 4 hours.

(c) VMT = Vehicle-miles-traveled;
VHT = Vehicle-hours-traveled;
DELAY = Added VHT due to travel at less-than-policy speeds;
%'s in VMT, VHT and DELAY columns indicate proportion on surface streets relative to freeways;
SPD = Speed (mph) - upper and lower values reflect freeway and surface-street conditions respectively;
DEL = Percent of VHT in delayed conditions on freeways and surface streets respectively.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988.

(continued)

Table 30 (continued)

ON-ROAD MOBILITY - SCAG URBAN REGION

FACILITIES-INTENSIVE SYSTEM (STRATEGY-1) WITH 2010 BASELINE (GMA-1)

	AM [b]					DAILY				
COUNTY	VMT [c]	VHT	DELAY	SPD	DEL	VMT [c]	VHT	DELAY	SPD	DEL
LOS ANGELES	25,085,486	700,966	108,388	44.3	19.5%	188,664,379	4,939,988	410,038	49.4	10.2%
	33.9%	46.5%	32.5%	26.0	10.8%	36.7%	51.0%	39.9%	27.4	6.5%
ORANGE	10,016,212	352,095	114,448	36.6	33.4%	72,665,080	2,092,241	380,253	45.3	17.6%
	34.8%	49.3%	47.9%	20.1	31.6%	33.9%	49.3%	50.8%	23.9	18.7%
RIVERSIDE [a]	4,206,964	147,590	57,385	34.1	37.9%	32,351,545	899,024	213,570	43.3	21.2%
	36.5%	47.0%	48.3%	22.2	40.0%	33.5%	44.8%	50.8%	26.9	26.9%
SAN BERNARDINO [a]	3,997,593	136,271	42,706	39.9	27.5%	30,419,196	850,362	130,191	46.8	14.9%
	43.1%	58.1%	63.2%	21.8	34.1%	45.3%	58.2%	59.4%	27.8	15.6%
VENTURA	1,760,905	48,538	5,232	52.8	4.0%	15,381,194	389,934	18,497	53.6	2.5%
	45.3%	62.4%	86.1%	26.3	14.9%	43.9%	58.7%	77.9%	29.5	6.3%
URBAN REGION [a]	**45,067,160**	**1,385,460**	**328,159**	**41.1**	**25.3%**	**339,481,394**	**9,171,549**	**1,152,549**	**47.7**	**13.3%**
	35.6%	**49.0%**	**45.5%**	**23.6**	**22.0%**	**36.9%**	**51.0%**	**48.3%**	**26.7**	**11.9%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County.

(b) The AM-Peak period includes the hours from 6:30-8:30am for all model results except those of the Proposed Project (GMA-4MJH with Proposed System), where the AM-Peak has been doubled to 4 hours.

(c) VMT = Vehicle-miles-traveled;
VHT = Vehicle-hours-traveled;
DELAY = Added VHT due to travel at less-than-policy speeds;
%'s in VMT, VHT and DELAY columns indicate proportion on surface streets relative to freeways;
SPD = Speed (mph) - upper and lower values reflect freeway and surface-street conditions respectively;
DEL = Percent of VHT in delayed conditions on freeways and surface streets respectively.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988.

(continued)

Table 30 (continued)

ON-ROAD MOBILITY - SCAG URBAN REGION

PROPOSED PLAN WITH YEAR 2010 GMA-4MJH (GROWTH MANAGEMENT PLAN)

COUNTY	AM [b] VMT [c]	AM VHT	AM DELAY	AM SPD	AM DEL	DAILY VMT [c]	DAILY VHT	DAILY DELAY	DAILY SPD	DAILY DEL
LOS ANGELES	32,416,651	921,551	116,085	44.0	20.1%	159,936,107	4,532,637	544,767	43.5	20.9%
	43.7%	54.9%	28.1%	28.0	6.5%	44.0%	54.6%	21.0%	28.4	4.6%
ORANGE	11,590,930	323,566	38,062	45.4	17.4%	56,002,634	1,548,240	175,171	45.6	17.1%
	41.3%	53.7%	31.5%	27.6	6.9%	40.6%	52.9%	28.8%	27.8	6.2%
RIVERSIDE [a]	5,419,037	143,430	23,268	43.4	21.2%	27,182,847	699,024	101,837	45.1	17.9%
	48.7%	55.3%	41.6%	33.3	12.2%	46.5%	53.9%	43.2%	33.5	11.7%
SAN BERNARDINO [a]	5,446,453	142,459	12,246	49.3	10.3%	27,068,608	699,975	51,467	49.8	9.4%
	47.3%	59.2%	51.0%	30.6	7.4%	47.5%	59.2%	47.7%	31.0	5.9%
VENTURA	2,845,389	75,460	6,580	52.4	4.8%	14,191,306	369,733	26,145	50.9	7.4%
	44.4%	60.0%	78.0%	27.9	11.3%	45.3%	58.8%	56.6%	29.6	6.8%
URBAN REGION [a]	**57,718,460**	**1,606,466**	**196,241**	**45.0**	**18.2%**	**284,381,502**	**7,849,609**	**899,387**	**44.9**	**18.3%**
	44.1%	**55.3%**	**33.5%**	**28.6**	**7.4%**	**43.9%**	**54.8%**	**27.6%**	**29.1**	**5.8%**

(a) The Urban Region includes all of Los Angeles, Orange and Ventura Counties, the western portions of Riverside and San Bernardino Counties, and none of Imperial County.

(b) The AM-Peak period includes the hours from 6:30-8:30am for all model results except those of the Proposed Project (GMA-4MJH with Proposed System), where the AM-Peak has been doubled to 4 hours.

(c) VMT = Vehicle-miles-traveled;
VHT = Vehicle-hours-traveled;
DELAY = Added hours due to travel at less-than-policy speeds;
%'s in VMT, VHT and DELAY columns indicate proportion on surface streets relative to freeways;
SPD = Speed (mph) - upper and lower values reflect freeway and surface-street conditions respectively;
DEL = Percent of VHT in delayed conditions on freeways and surface streets respectively.

Source: SCAG. Regional Transportation Model. Unpublished data, August 1988.

10. Contributing Parties

10. CONTRIBUTING ORGANIZATIONS AND INDIVIDUALS

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
600 South Commonwealth Avenue, Suite 1000
Los Angeles, California 90005
(213) 385-1000

EXECUTIVE COMMITTEE OFFICERS: (RMP Policy Direction)

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SCAG STAFF: (RMP Preparation)

Mark Pisano, Executive Director
Louis F. Moret, Chief Operating Officer

Patricia Nemeth, Director, Environmental Planning
Paul Hatanaka, Principal Planner
Joanne Freilich, Principal Planner
Delaine Winkler, Associate Planner

James Gosnell, Director, Transportation Planning
Roger Riga, Principal Planner (former position)
Judith Hamerslough, Senior Planner

PLANNING CONSULTANTS RESEARCH
1251 Santa Monica Mall, Suite One
Santa Monica, California 90401-1307
(213) 451-4488 - FAX 451-5279 (EIR Preparation)

Gregory J. Broughton, Principal
Jay Kaplan-Wildmann, Project Manager
Bruce Lackow, Environmental Associate
Janet Dosker, Administrative Assistant
Miriam Koral, Environmental Associate
Kishore Lal Manandhar, Environmental Intern
Trevor Lauten, Environmental Intern
Ron Miller, Graphic Artist


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Desert Center
Blythe
40
95
62
10
86
78
111
115